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ABSTRACT

This yearbook focuses on technology, its power to improve education from within and without its boundaries, and its fiscal impacts. Eleven chapters are organized in three major sections that address: policy changes facing the global village (chapters 1-3); national and state issues (chapters 4-6); and curriculum, training, and local development (chapters 7-11). The chapters are as follows: (1) "The GINIE Project: Responsible Neighbors, Many Generations" (Maureen W. McClure); (2) "State Financing of International Higher Education Partnerships for Trade and Development" (Emily Vargas-Baron); (3) "Education, Technology, and the Social/Economic Order" (Srebren Dizdar & Cecilia Wandiga); (4) "Common "Mythstakes" in Technology Planning" (Karen Fullerton); (5) "The Coming Crisis in Student Access to Educational Technology: Revisioning the State and Federal Roles in Funding" (Faith E. Crampton); (6) "Teachers and Parents without School Buildings: How Teacher Unions Can Use Technology Creatively" (F. Howard Nelson); (7) "At a Distance: Using Technology in Distributed Learning in Higher Education" (Barbara Y. LaCost, Alan T. Seagren, & Sheldon L. Stick); (8) "Technology and Change in School Administrator Preparation" (Hank Bromley & Stephen L. Jacobson); (9) "Preparing Teachers To Teach with Technology: The Costs and Benefits of Developing an Electronic Community of Learners" (Michael L. Waugh & Marianne Handler); (10) "Images of the Future: Crystal Ball Gazing and Technology Policy Making" (James F. Angevine); and (11) "Bits 'n' Bytes: Epilogue and Prologue" (Kathleen C. Westerbrook). Background on the contributors, a list of the 1997-98 American Education Finance Association Board of Directors, and an index are included. Most chapters contain references. (DLS)

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TECHNOLOGY AND THE EDUCATIONAL WORKPLACE

Understanding Fiscal Impacts

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Kathleen C. Westbrook

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Technology and the Educational Workplace

Understanding Fiscal Impacts

1997 Yearbook of the American Educational Finance Association

Editor: Kathleen C. Westbrook

If you're interested in how education and technology can work together to improve relations in the "global village," you'll want to read this book.

Here is the latest research on how technology can improve education and help create a worldwide educational environment.

Chapter authors discuss various ways in which technology is changing education. They explore exciting new programs for training administrators and teachers how to use, teach, supervise, and get the most from the technology in their schools.

You'll gain insights on how to develop the negotiating skills to obtain funds for implementing *and running* your technological programs. Find out how to ensure a technologically advantaged education for all your students. Learn strategies you can use to overcome technology resistance from staff, parents, and students.

TECHNOLOGY AND THE EDUCATIONAL WORKPLACE

EIGHTEENTH ANNUAL YEARBOOK
OF THE AMERICAN EDUCATION FINANCE ASSOCIATION
1997

TECHNOLOGY AND THE EDUCATIONAL WORKPLACE

Understanding Fiscal Impacts

Editor
Kathleen C. Westbrook

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Preface

It is a unique opportunity to be selected as editor of an AEFA yearbook. Only once in a great while do we have the opportunity to have a "stage" on which to display and write about the things that are most important to us. This volume is one of those rare opportunities. For quite a few years now, I have been involved in the struggle to bring technology into the lives of our profession—both in the university and K-12 sectors. I have heard all of the clichés many times over about "We don't do that here," or "We can't afford it," or "We don't have the time to learn that"; yet, like that venerable comic-strip character Charlie Brown, I keep pounding my head against that proverbial tree, and like that childhood sage, I reply to the question, "Why do you keep banging your head against the tree?" with "Because it feels so good when I stop!" Some might say this is the half-empty approach; I prefer to believe it is the tenacious one.

Tenacity—that is what the authors of this volume exemplify. They have met the challenge of technology head on and, in their own ways are the victors in the ongoing battles. The fiscal issues identified in these stories are glaring, for they remind us of yet how far we need to go professionally as we make the final turn into the next century. They remind us also of the unsung heroism that lurks within each of us. These are stories from the field—in some cases literally from battlefields—on the courage, spirit, and dedication that these pioneers foster within themselves. They are stories of hope, as they represent

the finest thinking and hoping within the professions of research, analysis, and policy. They are also stories of frustrations—at the waste, lack of vision, and irresponsibility of those with the power to move our educational systems around this ever-shrinking globe into a more harmonious whole and with greater forward momentum.

We open our story with international songs. Maureen W. McClure's chapter on the GINIE project brings home the dedication and commitment of individuals in the United States to seek a humanistic solution to isolation and devastation via technologic means.

Emily Vargas-Baron shows how state financing of higher education partnerships helps to increase trade and economic development.

Next, a chapter by Sreben Dizdar and Cecilia Wandiga takes us to war-torn Bosnia-Herzegovina to keep education on the front burner for the next generation of children in that war-ravaged country. The fiscal devastation, graft, and political corruption do not prevent the education of its children. For these individuals, commitment to the future is more important than the present. Fiscal and personal sacrifices are negligible when compared to a future of uneducated or undereducated leaders.

In the section on state and local issues, Karen Fullerton cautions us on the mythic crutches we use to keep ourselves—and our institutions—from moving forward at more than a snail's pace and to maintain our comfortable status quo.

Next, the section offers two unique perspectives—one on "revisioning" our state and federal roles and one on how teacher unions can become a creative part of the process. Both Faith E. Crampton (NEA) and F. Howard Nelson (AFT) bring the unique perspective of the two major teacher bargaining units to bear on these issues. Where and how does technology and its fiscal availability become a roadblock to access and equity for children? How can teachers and parents use this medium to keep in touch with, rather than becoming more isolated from, their children and their children's schooling?

In Section III the focus turns to those affecting training and professional development in K-12 teacher, administrator, and higher educational settings. Here, Barbara Y. LaCost, Alan T. Seagren, and Sheldon L. Stick tell us about unique programs designed to model new ways of thinking, knowing, and behaving. We also hear from Hank Bromley, Stephen L. Jacobson, Michael L. Waugh, and Marianne Handler on

how institutional resources can add to—or frustrate—the individuals trying to implement these programs, and how the clients—the teachers and faculty exposed to them—react to new service delivery systems and methodologies and where and how resources are needed in this process of change.

The last two chapters take us into the policy arena. Chapter 10 helps us see this entire picture from the state legislative point of view. Here, James F. Angevine shoots straight from the hip at those of us who work with legislators. He challenges us to engage in a little crystal ball gazing to envision and begin the dialogues on what the future could be—and what roles we can play before the final curtain.

The final chapter in this volume takes us from where we've been to where we're going. It challenges us as fiscal analysts to be drumbeaters, cajolers, and advocates of new ways of viewing the traditional area of fiscal resource allocation. Knowing what we know about the startup costs, staff development needs, and rates of obsolescence of technology requires us to be much more proactive and creative in how we approach the resource provisions, equity, and access issues that for so long have consumed our analysis. This volume was a great challenge—and opportunity. Without the unceasing cooperation of Corwin Press, Ann McMartin and the Corwin editorial staff, it would never have come to print. An incredible debt of gratitude is also owed to Dr. Mary McKeown-Moak, whose belief in this as a timely topic for an AEFA yearbook can never adequately be repaid. And last, to the two most wonderful professional colleagues and mentors anyone could ever hope to find—Dr. Maureen McClure and Dr. Gene McLoone—I am deeply indebted for their unceasing and unerring dedication to the quality of this volume and to their personal commitment and support during the hills and valleys that accompany any task of this magnitude.

Kathleen C. Westbrook

Introduction

On my desk is a wondrous photograph. I recently acquired it while working with the education specialist from the Adler Planetarium and Astronomy Museum. We were developing their new World Wide Web site for an Illinois State Board of Education Science Teacher Enhancement grant titled "Near and Far Sciences for Illinois." In this project, science teachers from around the state of Illinois will engage over the next 9 months in activities to develop their knowledge and teaching skills in the areas of astronomy, geology, and meteorology. The Web site (http://newton.dep.anl.gov/nfsci/index.htm) will be used in conjunction with their regional activities and in collaboration with the scientists who will be working on the project. The photograph is amazing in its color, clarity, and definition. It is a photograph of the Eagle Nebula. This nebula contains hydrogen and microscopic dust particles, which are the raw materials for new stars. It gets its name from the bird of prey with outstretched wings and talons. The wonderment of this photograph is that it exists at all. The Eagle Nebula is 2 million years old and located in the southern Milky Way—more than 7,000 lightyears from earth. Seven thousand lightyears—the mind cannot even comprehend such a distance. Yet, here I am looking at a photograph of stars being born at a distance I could not travel during my lifetime. Our own galaxy would fit comfortably inside one of the "eggs" (evaporating gaseous globules) that are the genesis of newly forming stars. The nebula itself has one branch that is nearly one

lightyear in length from top to bottom (a lightyear is the distance light travels in a year, or 6×10^{12} or 5 trillion 900 billion miles). How is this photograph possible? The answer: *technology*. The Hubble Space Telescope, for all its problems, has enabled researchers at Arizona State University to photograph this wondrous sight without ever leaving the comfort of their offices, cities, communities, or planet.

This is the ushering in of a "New Age." Society's advancement is no longer constrained by cosmological, geographical, or political restrictions. The basis of our lives, predicated on capital exchange and formation, is changing as are the sands of the desert, beneath our very feet. Not only computers, but technology itself is changing the fabric and meaning of culture, time, distance, and space. With a cellular phone no larger than a wallet, we can call halfway around the globe and place an order, select a product, or run a multinational corporation. In the wink of an eye, we can communicate with astronauts revolving about the earth in a space capsule to conduct experiments and repairs on satellites and ships in the void of outer space. Yet, with all this "instantaneous" communication, we find a global environment rife with turmoil this technology was supposed to ameliorate—war, famine, homelessness, poverty, urban and educational blight, racism, political and religious intolerance, and economic distress.

This 1997 Yearbook of the American Education Finance Association is unique. It is not simply another year's look at the ways we view education finance allocation formulas or develop distributional policies. It is not simply a series of articles reviewing the variance in spending between and across districts in regions, states, or provinces or the formulas used to calculate those variances. Instead it s-t-r-e-t-c-h-e-s us as finance professionals. It calls on "voices from the field"—voices speaking not just about domestic tranquillity but about global educational environments. It focuses on technology, uses technology, and looks at the power of technology to improve education from within—and without—its boundaries.

In this volume, you will hear voices raised in song and laments of woe. The strength of this yearbook is its daring to go beyond where we have ventured before to include topics and people who work in education both inside and outside our universities. You will hear about wonderful new ways of training administrators and the institutional frustrations that accompany "innovation." You will hear

voices of praise for the exciting possibilities technology has brought into our lives as researchers and policymakers and hear also the clamoring sounds made in resistance to change by students and colleagues alike. You will hear also duplicity at times—duplicity from state-level policymakers who want educational systems to embrace technology but don't themselves understand the personnel, training, or capital burdens such technological foci place on schools, their managers, or communities. You will hear the sounds of war—and of peace—from individuals who at great personal sacrifice to their own safety believe the future lies with children and that technology can bring them back from the devastational edge of man-made conflict. This is "storytelling" in the finest tradition—a tradition of rich history in the sociological field, now coming into its own in education finance. These are stories that will enrich us and provide fodder for our intellectual and professional growth.

In this volume, you will hear from individuals who are school finance professors, career diplomats, policy analysts, researchers, and administrator and teacher educators. But they are *not* primarily "techies"—that is critical for understanding what you will read. These are folks just like you who want the best for their students, colleagues, profession, and progeny. They are users of technology. They see its fiscal as well as professional and sociological implications manifest in everything they do each and every day. They are reporting on where we are and where we need to go to improve training and education within and across our borders and convince policymakers and legislators what types and quantities of resources we need to accomplish that vision.

I prefaced this book by saying it was a unique volume. This is, indeed, a "New Age" in the annals of education finance. I hope this is the dawning of a renaissance in which such voices will continue to be raised to enrich our profession and bring new energy and synergy to what we do and reverberate with how we plan to plan for the generations that come after us.

About the Contributors

James F. Angevine is a Research Specialized Consultant with the Education Committee of the Pennsylvania House of Representatives. Prior to joining the Education Committee, he served in public education for more than 21 years. He has been a school administrator for more than 16 of those years, with specializations in planning, finance, and technology. He is currently responsible for analyzing educational finance and technology policy issues; maintaining a K-12 district database; and working on other education issues, such as school vouchers and charter schools. He holds both the master's of science in education and the master's in education in school administration.

Hank Bromley is Assistant Professor in Sociology of Education and Associate Director of the Center for Educational Resources and Technologies at the State University of New York at Buffalo (UB). He received his PhD in educational policy studies from the University of Wisconsin—Madison. His interests center in the areas of education and social change, the politics of technology, and feminist theory. He has recently published in *Educational Theory* and in *Teaching Education* (with Alison Carr). His book *Education/Technology/Power: Educational Computing as a Social Practice* (co-edited with Michael W. Apple) is currently in press at SUNY Press.

Faith E. Crampton is Professional Associate in the Economics and Education Finance Program of the Research Division of the National Education Association, Washington, D.C. She holds a PhD in Educational Policy and Leadership with an emphasis in Public Finance from the Ohio State University. Prior to her position with NEA, she was Program Principal in Education Finance at the National Conference of State Legislatures where she was primary author of *Principles of a Sound State School Finance System.* She has also served on the Graduate Faculties of the Schools of Education at the University of Oregon and the University of Rochester (New York). Her research has focused on state funding of education to achieve greater equity and efficiency. She has published widely in journals such as the *Journal of Education Finance,* the *Journal of School Business Management,* and the *Journal of the Council of Education Facilities Planners International.* She is Past President of the Fiscal Issues, Policy, and Education Finance Special Interest Group of the American Educational Research Association and has served on the Board of Directors of the American Education Finance Association.

Srebren Dizdar studied English and French literature at the University of Sarajevo (1974-1978, BA in 1978), with postgraduate studies in literature at University of Belgrade (1978-1979) and University of Leicester (Great Britain, 1979-1980). He received his MA in modern English and American literature from the University of Leicester, 1981, and his PhD from the University of Sarajevo, 1989. He was a Fulbright Scholar at the University of Southern California, 1987–1988. From 1982 until 1990, he served as journalist, international relations coordinator, Chief of Staff, and media officer for Radio and television Sarajevo, and from 1990–1992, he was Editor-in-Chief for a biweekly "Business Newspapers" in Sarajevo. He has served as Assistant Minister for Science in the Ministry of Education, Science, Culture, and Sports of Bosnia and Herzegovina (1993); as Permanent Secretary in the Ministry of Education, Science, Culture, and Sports (1993-1996); and, currently, as President of the UNESCO National Commission for Bosnia and Herzegovina. He serves as Assistant Professor at the University of Sarajevo Department of English (since 1994), where he teaches 18th- and 19th-century English novels and English romantic poetry; and in the Department of Comparative and World Literature

(also since 1994), where he teaches the 20th-century novel. He writes articles on English, American, and African literature, as well as education, history, politics, and media, and translates poetry and fiction from English into Bosnian.

Karen Fullerton, MEd, is a doctoral candidate in instructional design and technology and a research associate with the GINIE and PENDOR projects at the University of Pittsburgh School of Education. Her research interests include television effects and computer interface design. She has taught technology and communication courses at the University of Pittsburgh, Duquesne University, and the Pennsylvania State University (Beaver).

Marianne Handler is Chair, Technology in Education Program, and Associate Professor in the Technology of Education Program, National College of Education, National-Louis University. She has been working with students, teachers, and technology since the mid-1980s. Her research interests center in the areas of technology integration in the curriculum, including supports needed by K-12 practitioners and reforms for providing technology experiences for students in preservice education. She has been using the ISTE Foundation Standards for Technology as a model for designing technology experiences in teacher education courses. She is coauthor of *The Data Collector* (Intellimation), a Hypercard-based tool for analyzing qualitative data. She is coauthoring (with Ann Dana) the second edition of *Hypermedia as a Student Tool: A Guide for Teachers* (Libraries Unlimited/Teacher Ideas Press).

Stephen L. Jacobson is Associate Professor in the Graduate School of Education at the State University of New York at Buffalo (UB). He received his PhD from Cornell University, and his dissertation was the recipient of the American Education Finance Association Jean Flanigan Award for Outstanding Research in the Field of Educational Finance. From 1992 to 1997, he was Coordinator of UB's Educational Administration program and is currently Director of the Center for Continuing Professional Education. He also helped to design and instruct the Leadership Initiative for Tomorrow's Schools (LIFTS), a new approach to the preparation of school leaders. His research

interests include the reform of educational administration preparation and practice, teacher compensation, and absence and the social organization of the school workplace. In addition to numerous journal articles, his most recent books include *School Administration: Persistent Dilemmas in Preparation and Practice* (Praeger, 1996) and *Transforming Schools and Schools of Education: A New Vision for Preparing Educators* (Corwin, 1998). In 1994, he was awarded the University Council for Educational Administration Jack Culbertson Award for outstanding contributions to the field of educational administration by a junior faculty member.

Barbara Y. LaCost, Associate Professor in the Department of Educational Administration at the University of Nebraska—Lincoln, has past experience as a public school teacher and coordinator in special education and federally supported programs. Her research interests include equity analyses of state funding plans, implementation of state fiscal policies, and issues related to allocation of resources at the school site. She has published in the *Economics of Education Review, Journal of Education Finance, Educational Considerations,* and the *Journal of School Leadership.* She was lead author of the resource allocation chapter in the National Policy Board for Education Administration's *Principals for Changing Schools.* Currently a member of the AEFA Board of Directors, she also serves as Vice-Chair of the School Finance Research Committee for the Association of School Business Officials and as Chair of the Fiscal Issues, Policy, and Education Finance SIG of the American Education Research Association. In the past year, she has been instrumental in the development and delivery of courses offered to master's students through the use of LotusNotes Groupware.

Maureen W. McClure is Associate Professor at the University of Pittsburgh and Director of the Global Information Networks in Education (GINIE) Project. GINIE provides information services to those working in education for humanitarian and technical assistance and economic partnerships in nations in crisis and rapid transition to democracies and market economies.

F. Howard Nelson is Senior Associate Director of the Department of Research of the American Federation of Teachers (AFT) and has been

with the AFT since 1986. He received the master's in economics and PhD in educational policy studies from the University of Wisconsin—Madison. Prior to joining the department, he taught school finance in the Department of Educational Policy Studies at the University of Illinois at Chicago. He has published many articles in journals such as *American Education Research Journal*, the *Journal of Law and Education*, *School Business Affairs*, *Education and Evaluation of Policy Analysis*, *National Tax Journal*, the *Journal of Education Finance*, and others. In addition to producing AFT's annual 50-state salary survey, his recent work includes an analysis of the private management of public schools in Baltimore and a report on the enrollment and costs of the Cleveland voucher program. Recent reports are posted at http://www.aft.org/research.

Alan T. Seagren has served as public school teacher and administrator, college faculty, Director of Summer Session, Associate Vice Chancellor for Academic Affairs at the University of Nebraska—Lincoln, and Vice President for Administration for the University of Nebraska system. In 1992, he returned to full-time teaching as Professor of Educational Administration, specializing in higher education. He created the Center for the Study of Higher and Postsecondary Education, for which he serves as Director. His early research focused on staff development training using videotape and observational systems for feedback. Recently, his research has focused on departmental leadership, and he has coauthored three books related to the position of chairman. Internationally, he has been a visiting scholar in Australia, Japan, China, and Scandinavia. He has held elected office in four national organizations and is a member of the board of directors for several community agencies and church units. He has been a staff member for the Institute for Leadership Development conducted by the National Community College Chair Academy and most recently has provided the leadership for delivery of a distributed doctoral program in educational leadership using LotusNotes Groupware with students in several states in the United States, Guam, Canada, and Australia.

Sheldon L. Stick is Professor in the Department of Educational Administration at the University of Nebraska—Lincoln and works pri-

marily in the Center for the Study of Higher and Postsecondary Education. He has conducted on-line graduate-level computer courses for the past 3 years using LotusNotes Groupware. He coordinates 7 to 10 sections of the Foundations of Modern Education Program for the Teachers College each semester and participates in the team teaching of an experimental section of the program. He has been an elementary teacher, basketball coach, high school debate coach, and military officer and served on the faculty of three land grant postsecondary institutions and held adjunct professorships at two other institutions. He has been coordinator of a clinical service program, department chair, and campuswide multidisciplinary training and service program director. He holds a Certificate of Clinical Competence in Speech-Language Pathology and worked as a private practitioner and consultant for 17 years.

Emily Vargas-Baron is Deputy Assistant Administrator of the U.S. Agency for International Development (USAID) and Director of the Center for Human Capacity Development, responsible for the agency's global programs in education and training. She received her PhD in anthropology from Stanford University and was an Associate of the Stanford International Development Education Center. For 4 years, she worked in UNESCO as an educational planner in Europe, Latin America, the Caribbean, and the Middle East. Subsequently, she served for 6 years with the Ford Foundation as the Education Advisor for the Andean Region of Latin America. She conducted research projects in Colombia, including the first national-level study of nonformal education. On returning to the United States, she taught at the University of Texas. She founded and directed the Center for Development, Education and Nutrition (CEDEN), located in Austin, which has five service centers and many program replication sites in Texas and other states. Concurrently, she was a consultant for USAID, nongovernmental organizations, state and federal agencies, regional organizations, and national governments. She is the author of many books, articles, and research reports on educational policy planning, nonformal education, early childhood development, higher education, and computer-based educational technologies.

Cecilia Wandiga is a Policy Analyst for the city of Pittsburgh's Planning Department. She performs research and analysis of a variety of subjects ranging from demographic changes to employment strategies for specific populations. She received the MS in public management at Carnegie Mellon University. Some of her accomplishments include mention in the 1997 *Who's Who in the East*, presenting at the 1995 Midwest and Northeastern Regional Meeting of the Comparative and International Education Society, and designing a database currently being used by the Commission for Workforce Excellence to match employment opportunities with available training programs as well as determine training needs for Allegheny County. She has lived in Connecticut, Colorado, Puerto Rico, and Kenya and hopes to live to see the worldwide eradication of poverty.

Michael L. Waugh is Associate Professor of Curriculum and Instruction at the University of Illinois at Champaign—Urbana. He has been involved with electronic networking since 1986. His primary research interest is in trying to establish the impact and long-term value of instructional interactions on electronic networks. A particular area of interest is examining how computer networking can be integrated into teacher education programs to facilitate apprenticeship experiences between students, teachers, student teachers, professors, private sector businesspersons, and other individuals participating in the educational process. He has most recently been exploring models of fostering teaching teleapprenticeships among undergraduate and graduate students with practicing K-12 teachers and students to enhance university teacher preparation.

Kathleen C. Westbrook is Science and Technology Associate and Master Trainer, Division of Educational Programs/Educational Technology, Argonne National Laboratory—East, Argonne, IL, and co-owner of the DeerStar Group, Ltd., a technology research, development, and training corporation. She conducts training for the Chicagoland Educational Networking Consortium, local K-12 school districts, and Illinois service centers in the Chicagoland area. She is former Assistant Professor of Educational Leadership and Policy Studies, Loyola

University of Chicago and Portland State University, Portland, OR. She serves as Adjunct Professor of Education for National College of Education/National-Lewis University and Aurora University, Aurora, IL. She was awarded the PhD in educational administration with emphasis in financing educational technology and facilities from the University of Illinois at Champaign—Urbana. Her current interests center on electronic transactions and taxation of electronic commerce as a funding stream for schools, use of Groupware as a collaborative sharing tool for educational planning, and interactive CD-ROMs for human resource development service delivery.

SECTION I

Policy Changes Facing the Global Village

ONE

The GINIE Project
RESPONSIBLE NEIGHBORS, MANY GENERATIONS

MAUREEN W. McCLURE

Networks to Reduce Expensive Isolation

Many school districts are isolated from each other and from their communities. Teachers often know little about what their neighbors in the community and in the profession are doing, sometimes even when those neighbors are in the same building. Such isolation can be expensive when it leads to unnecessary duplication and waste. The Internet offers new opportunities for those in education to learn from their professional and community counterparts, whether they are 12 or 12,000 miles away. Networks for shared learning about education are increasingly important because many education communities in the world are struggling with similar problems and can benefit from each other's experience. Education community networks are not only a effective way to form human capital but also both a growing social responsibility and a generative source for the economy. Civil democracies, market economies, and complex technologies all require a

well-informed public to make individual decisions with critical consequences for many others, including future generations. As gaps between rich and poor continue to widen, low-cost access to high-quality, timely educational information, expertise, and telecommunications technologies will play an increasingly central role in education for humanitarian aid and economic development in the United States and internationally. The Global Information Networks in Education (GINIE) project is one response to these concerns. It is a long-term educational commitment to the protection of children's futures in communities under chronic economic stress.

The GINIE project is headquartered in the Institute for International Studies in Education (IISE), School of Education, University of Pittsburgh. GINIE is sponsored by the Human Capacity Development Center at the U.S. Agency for International Development (USAID) in partnerships both with U.S. and international educational organizations. Its primary partnership is with an interagency consultation on education for humanitarian assistance sponsored by the United Nations Educational Scientific and Cultural Organization (UNESCO) International Bureau of Education (IBE), the International Council of Voluntary Agencies (ICVA), the United Nations High Commission for Refugees (UNHCR), the United Nations Children's Fund (UNICEF), and the United Nations Department of Humanitarian Affairs (UNDHA). The consultation's office is housed in the Education for Humanitarian Assistance Unit of the IBE in Geneva and is headed by Gonzalo Retamal, currently on a long-term mission in Iraq.

A Strategy of Responsible Neighbors

GINIE is a rapid response strategy for education in nations in crisis and rapid transition to democracies or market economies. Its mission is to provide rapid access to information and expertise related to humanitarian aid, technical assistance, and economic partnership for those working in education in these nations. It helps link people concerned about education in these countries with each other and with counterparts internationally. It accomplishes these goals through (a) an Internet repository of existing information and expertise that can be shared both on- and off-line; (b) complex, multilevel commu-

nications networks (phone, fax, e-mail, lists, on-line conferences); and (c) programs of research, technical assistance, and training. GINIE's intent is to (a) promote the formation of human capital through international networks for professionals and communities by lowering information and transactions costs for educational improvement and (b) demonstrate to the general public the ongoing contributions of education to humanitarian aid, technical assistance, and economic development.

GINIE's long-term interest is educational improvement that leads to community and regional development, not only internationally but domestically as well. It considers a community or regional education sector as a whole, along with its related social service and commercial links, as an *education economy*. An education economy grows out of a response to both public and private needs for learning and innovation across generations. The GINIE strategy does not seek to coordinate these efforts through a centralized bureaucracy; rather it provides opportunities for professionals to leverage scarce resources more efficiently. This approach focuses on helping institutions and professionals lower their decision costs by providing access to information and expertise that can help them "map" their position relative to others under constantly changing conditions. For example, if potential donors and investors can "see" what others are doing, they may be able to make better decisions about leveraging their own scarce resources.

The GINIE strategy treats education as a "supramarket" activity. It asserts that the relationships across children, parents, and teachers are too complex to be captured by a metaphor of commodity markets of supply and demand, driven by private property rights. It argues that the consequences of today's educational relationships for current and future generations cannot be adequately captured by contemporary measures of return to personal or national income. Education is deeply linked to more than income measures. It is necessary for the legitimacy of states and economies. Democracies and market economies assume personal political and economic responsibilities for sustainability because they are necessary for participation in self-governance and markets. The public duty to protect children's futures cannot be relinquished either in the voting booth or in the marketplace.

The consequences of this generation's investments in education, its finance, and its technology for the world's children will be experienced for many generations. GINIE challenges education professionals throughout the world to begin thinking about their responsibilities for children of the next millennium. Most education reform efforts in the United States and internationally focus on changing systems, not on sustaining civil and creative relationships over time. Reformers need to ask how education professionals, both in the United States and internationally, intend to contribute to the well-being of the world's current and future children. GINIE's longer-term relationship approach extends reform thinking to include a "dialogue of duty" for the next 50 generations.

Global Shared Resourcefulness

The GINIE strategy intends to avoid relationships of donor-recipient dependence by encouraging a longer-term "neighborly" approach that emphasizes cooperative self-interest across education professional communities both internationally and in the United States. It uses Inter/Intra/Extranet networks to help educational communities stay in close contact and keep each other informed as they respond to nations in crisis and rapid transition. The establishment of longer-term GINIE networks of communication for "shared resourcefulness" also helps contribute to the prevention of future crises through shared lessons learned.

GINIE's structure rests on a repository and on complex sets of networks that focus on (a) narrow professional themes such as land mine awareness education or improving educational quality at the classroom level under conditions of chronic economic stress and (b) country casebooks that share and analyze education efforts. GINIE's meta-network helps create a "one-stop shopping" site for those interested in education in nations in crisis and rapid transition. For example, communities in crisis may need rapid access to information and expertise about planning and financing in emergency conditions. Later, they may need access to materials and expertise about planning and financing recovery, reconstruction, and economic renewal. Teachers may also need rapid access to materials and expertise about

methods such as active learning that can help traumatized children regain their resiliency. Later, teachers may need access to information and expertise about helping children and communities overcome the lingering effects of trauma.

Education Economies and Rapid Growth of Professional Capital

The core of GINIE's strategy of shared resourcefulness is a belief that the academic colleague metaphor for professional development and the responsible neighbor metaphor for community development can work together to make good economic and political sense in communities in crisis and chronic economic stress. Professional experience is encouraged to be widely disseminated at relatively low costs. By lowering information and transactions costs through shared expertise, professional capital, like knowledge capital in the academy, can form quickly, thus creating and renewing an information infrastructure for the profession. Educational improvement can be enhanced more rapidly if professionals offer to share pro bono some of their work and experiences rather than remain isolated.

The neighbor metaphor is also helpful for shared development across education communities. Sometimes neighbors need a hand up, sometimes they need advice, and sometimes they have something to share or to trade. Neighbors are involved for the longer term. Only by working together can they preserve and enhance their property, keep their communities safe from bullies, and create a responsible generational legacy. Good neighbors share tools and experience, giving something with the expectation that something as good or better may come back to them someday. GINIE focuses on the intersections of professional and school communities in the hopes of creating more efficient communications for neighbors so they are less isolated and more innovative.

The Children's Generals

Strategy is too complex to be modeled. It plays out in stories. Here is one GINIE story; there are others. Apollo-Ridge School District, a

rust belt community nestled along the bucolic Kiskiminetas River in rural western Pennsylvania, struggled with lost local industry, the costs of environmental renewal, and an expensive and aging telecommunications infrastructure. The resulting economic problems are not unique to western Pennsylvania, as parents in many parts of the world worry that their children may have to leave home to find work.

With more wit than money, the community of Apollo generated innovative ways of leveraging scarce community and school resources to help children learn about development. Bill Kerr, the school district superintendent, directed many local development activities. He asked students to serve on the Apollo Area Economic Development Committee. Middle school teachers designed state-of-the-art, active learning, interdisciplinary curricula based on Apollo's revitalization project surrounding the town's old canal system. The tiny Apollo Trust Company, under the leadership of Ray Muth, became the first bank in the United States to act as a low-cost Internet provider for the community, creating free access to children and residents who kept a checking account with the bank. This small community bank also won the international top corporate banking Web site award in 1996.

Shortly after the Dayton Accords, Emily Vargas-Baron at USAID and Rob Fuderich, the senior education officer for UNICEF/Bosnia and Herzegovina (BiH), were concerned that "surviving the peace would be as difficult as surviving the war." UNICEF sponsored a trip to the United States for the author of those words, Srebren Dizdar, then Permanent Secretary for the federation Ministry of Education, Culture, and Sports in BiH. The visit to Apollo was organized by the GINIE project at the University of Pittsburgh. Dizdar had worked tirelessly under extraordinary conditions to keep children and teachers safe and connected with each other in "war schools." A network of education professionals, the "children's generals," spent the war years, mostly without pay, risking their lives daily to preserve education continuity for the next generation. These real-life heroes were remarkably successful.

Dizdar met with Apollo's community leaders and schoolchildren. He told them that Bosnians were grateful for U.S. sacrifices to end the war and ensure a just peace. Now that the war had ended, Bosnians were concerned about what would happen to them "after the CNN

camera lights go out." He said the country needed to rebuild quickly so that U.S. troops could return home to their own families.

Back to the Future

Dizdar said Bosnians were headed back to the future. They faced three problems, all at the same time. First, the economy was operating at 7% of its prewar capacity. It would take a long time to fully recover from the war. He said teachers joked that they had been on a "4-year sabbatical from the world" during the war and needed to catch up on developments in education that they had missed. He said he hoped that GINIE would use telecommunications technology to help Bosnians create domestic and international networks of educational colleagues and neighbors who would be interested in sharing information, expertise, and dialogue about new developments in education.

He said the international and Bosnian communities had few resources to help local communities make the transition from the war and reconstruction to decentralization and economic trade. He hoped that education exchanges could help ease these painful transitions. He invited both Apollo community leaders and the Secretary of Education for Pennsylvania, Eugene Hickok, to think not only about educational aid and assistance but also about initiating trade delegations. He suggested that not only would a system of teacher and student and policy counterpart exchanges be good for children and professionals, but credible education networks would also be good for business as well.

The second problem Bosnians faced was that the Dayton Accords mandated that the Bosnian educational system be devolved to the cantonal (county) level. The Bosnian educational system was highly rated before the war, but it was a very centralized national system in the former Yugoslavia. This rapid devolution created serious planning problems, as there was very little resident expertise in education administration or finance. New cantonal ministries were being formed, and there were highly experienced professionals in education, but few with the skills and experience needed to plan for decentralization. He said he came to Apollo to learn how communities in the United States worked closely with their schools in a decentralized

tax collection system. The United States has one of the most decentralized educational systems in the world, so U.S. professionals had a lot of experience with helping the public understand how local schools contributed to local communities. Dizdar hoped that a small network of education administration and finance professionals might be willing to share some time from their busy schedules to act as mentors in exchanges with Bosnian counterparts.

A third problem was that the introduction of new telecommunications technology created education opportunities that were not available before the war. Bosnians wanted to take advantage of these new technologies to "leapfrog" into an educational system that prepared children to work in a global economy and to build a sustainable domestic democracy. Dizdar hoped that children in the United States and in BiH would use the Internet to "grow up together" in this new technological environment, teaching each other now, trading with each other in the future.

He said Bosnians needed and wanted partnerships, not handouts. They needed longer-term, ongoing counterpart networks to exchange educational information and expertise. He said that Bosnian, Croatian, and Serbian teachers, students, and townspeople, like their counterparts in the United States, were trying hard to protect their children's futures by providing them with the best education possible. Like parents in Apollo, they too needed to develop their communities so that their children would not have to leave home to find work.

Need for Longer-Term Commitments From Regional Institutions

During the war, school buildings were devastated, and many teachers fled the country or were killed. Groups of committed teachers and parents founded war schools and created safe havens for children to learn. Many teachers took great risks in their personal lives for 4 years to ensure that children did not lose a single year of schooling. In Mostar, for example, where there was heavy fighting, one elementary school was shelled more than 50 times, sometimes for sport. Defiant teachers helped children travel to and from school throughout the war and not miss a single year of schooling. Djulsa Bajramovic, the dean

of the Pedagogical Academy in Mostar, lost her home, her husband, her only son, and later her dog. She stayed on to provide leadership for the war schools. Their record? Amazingly, not a single casualty for students traveling to and from school.

Strong networks of teachers were formed to share the materials they created and the lessons they learned. Clever teachers continually invented clever new ways to help students learn under extreme conditions. These creative networks held the system together during the war and became the core for the reconstruction of the educational system aftr it. Teachers during and after requested training in active learning methods from UNICEF so they could help children too traumatized by the war to be able to return effectively to more traditional pedagogies. Seth Spaulding at the University of Pittsburgh responded to these requests by establishing a field office in BiH headed by Lynn Cohen. Later, a team of University of Pittsburgh faculty members traveled to BiH to provide training workshops throughout the winter after the Dayton Accords, often without heat, electricity, or water. Instead of investing their time and efforts in earning consulting fees in safe, sunny climates, these professors skidded across icy roads with land mines close by.

Dizdar told the people of Apollo that a long-term commitment to mutual responsibility and respect was necessary to rebuild the country. He said that long-term, stable democratic relationships and market economies rested on the development of mutually respectful exchanges. He said that teachers and students need a deep continuity of support in their lives. Most project-oriented assistance could not provide it. School communities and professionals in other countries could. He asked if he could return with other Bosnian educators to visit Apollo and other school districts to learn more about public education and community partnerships in the United States.

In October 1996, the University of Pittsburgh professor Noreen Garman, codirector of the Institute for International Studies in Education and a seasoned traveler across icy Bosnian back roads, headed a technical assistance project with the Bosnian Ministries of Education for participatory planning for the renewal of teacher education programs in BiH, sponsored by the World Bank and the U.S. Information Agency (USIA). GINIE was an implementing partner. Now the president of the UNESCO National Commission for Bosnia and Herze-

govina and a University of Sarajevo professor, Srebren Dizdar led a team of 14 Bosnian federation Muslim and Croat educators to Pittsburgh and Washington, D.C. The team consisted of many of the war schools' children's generals. For almost all of them, it was their first trip out of BiH since the war. Many of these cosmopolitan European professionals (one had been a diplomat before the war) had been unable to leave their communities because they were under siege for 4 years. During the war, all of them spent long periods of personal terror without the comforts of electricity, heat, water, and sometimes food.

Apollo was their first experience with intact schools similar to their own before the war. The contrast between the devastation in their own communities and the scrubbed schools of Apollo was very difficult to observe, even for real-life heroes. Mira Melo walked into the school library and said softly, fighting back a tear, "Ours used to look just like this." Apollo teachers, students, and community members rose to the occasion, showering the team with warmth, sensitivity, and compassion. Soon, frivolity emerged over a pickup game of basketball in the gym.

At the closing ceremonies for their visit, the Bosnian team, seated on stage, asked if anyone in the auditorium had served or had family members who were serving or who had served with the U.S. military in BiH. A few people in the audience stood. The Bosnian team rose to their feet and applauded them, no longer fighting back the tears in their eyes.

Humanitarian Aid, Technical Assistance, and Economic Partnership

The GINIE project encourages the development of networks of educational counterparts to exchange information and expertise about issues they have in common. It uses technology as a base for linking education professionals and school communities through humanitarian aid, technical assistance, and economic partnership. The strategy asserts that (a) education professional and community relationships, where possible, should be long term, civil, and creative; (b) educational relationships should emphasize shared responsibility,

self-help, and development for each side; and (c) aid, assistance, and partnership relationships should be considered together as an ongoing national and subnational regional effort for cooperation across the education sector.

U.S. education efforts for aid, assistance, and partnership activities internationally are often initiated and performed by different well-intentioned people and agencies, nonprofit organizations, schools, colleges, and universities, often with little coherence or continuity. On one hand, the U.S. economy can no longer absorb the waste created by these isolated institutional efforts for aid, assistance, and partnership. On the other hand, a centralized coordinating bureaucracy would only exacerbate the inefficiency created by overfragmentation. The GINIE strategy of shared resourcefulness at the community level suggests that flexible electronic networks of rapid access to information, materials, and expertise, structured with regional education economy hubs centered in research universities may offer one way of lowering the costs of institutional planning, implementation, and evaluation.

Sic Transit Marshall

The GINIE approach to development complements more traditional approaches or "big aid." The post-World War II Marshall Plan approach infuses large cash flows into a postcrisis economy to help it build momentum. Unfortunately, many of today's crisis regions have economies that are too weak to respond adequately to a Marshall Plan approach of an intense quick boost to the economy through reconstruction as public works projects. Most of these regions faced conditions of chronic-to-severe economic stress before the crisis, making it very difficult for postcrisis reconstruction efforts to build and sustain political and economic momentum. In the past, the Marshall Plan helped restore legitimate economies that helped support legitimate states. All too often today, crisis creates illegitimate economies that gather momentum during the war and persist into a fragile peace.

These illegitimate economies profit from war and have little to gain from a stable state, a legitimate economy, and peace. Today's at-risk and crisis regions often have poor tax collection systems and weak

militaries that can neither contain nor control these "gang" economies. Gang economies are sometimes so privatized that they protect themselves through the use of paramilitary or mercenary troops, many of them with equipment and training superior to those of the local police or even the nation. Even more troubling, the new crisis economies are not found only in developing countries. Pockets of gang economies now erode the quality of education and threaten children's futures in communities in developed countries as well.

This wrenching disjuncture between a weak legitimate public state and a powerful, privatized illegitimate economy requires new responses more effective than the post-World War II Marshall Plan alone. How can today's forces for legitimate governments and markets overcome or subvert the momentum of illegitimate gang economies? What credibility will education have to a child with no access to a legitimate economy? In the United States and internationally, much of the education reform movement is focused on improving educational efficiency. Increasingly, in regions in crisis, rapid transition, and chronic economic stress, however, educational reform is a powerful and painful struggle for political and economic legitimacy.

GINIE' s presence offers a kinder, gentler approach to complement Marshall Plan efforts through providing and sustaining a low-profile, long-term international presence across transitional polities and economies.

Bosnian Professionals Have Much to Teach U.S. Counterparts

One of the great lessons Bosnian teachers on all sides of the war have taught the rest of the world is that basic education is more than teaching literacy in school buildings. It is more than a traditional civil service job with a small but steady paycheck. It is more than a new building or a winning athletic team. It is a fundamental moral commitment to the protection of children's futures. This protection lies not in buildings or government mandates but in the civility and resourcefulness of people who chose not to allow their ethnic identities to overwhelm their professional ethics.

Much of the educational reform rhetoric in the United States focuses on the financing of systems. The debate is important, but it too often diverts attention from the core of teaching: the ongoing civil and creative relationships that teachers, students, and community members make with each other. All else is a prop, useful but less essential. Bosnian teachers, faced with the loss of school buildings, taught in basements. Faced with the loss of electricity, water, and heat, they taught with flashlights, creating books with special paper that could be used in dim light. Teachers in Gorazde, faced with violent sieges aimed to disrupt schools and civil life, gathered children in the streets after a shelling to sing songs and play music. The real heroics of Bosnian teachers remind the rest of the world of what it too often forgets, that children are precious gifts that civil societies must protect.

These moral commitments to "zones of peace" are public and cannot be privatized. Democracies and free markets rest on the assumption that people are sufficiently well educated to make informed decisions at the polls and in the markets. A nation's continuing well-being rests on the civility and creativity of its citizens. Civility is not genetic. Each generation must learn it anew. It must be modeled by both parents and teachers. Education reform is as much about relationships of dignity, respect, and innovation as it is about systems of bricks, budgets, and buses.

Implications for U.S. Education Reform

The current rush to privatization may unleash consequences that will be regretted. In a world where birth control privatizes the childbearing decision, the rationale for investment in children's education can turn ugly. Parents want what is best for their children, but what about the children of others? The most rational decision for parents is to maximize the welfare of their own children. In a world of scarce resources and competition, that welfare can be maximized in two ways. The first is by enhancing their own children's access to educational resources. The second is by minimizing the access of competitors.

Why should parents invest in educational opportunities for their own children's future competitors? Liberals traditionally counter that

children in a school district or a state "belong" to it, and so the wealth of the district or state as a whole should drive education funding. Conservatives traditionally imply that those who chose to have children should bear the primary responsibility for their education, so parents need to have as much control over education subsidies as possible to make the best choices.

Highly decentralized financial systems funded primarily through residential property taxes tie children's educational opportunities to the wealth of their parents and not to the wealth of the nation as a whole. Is there a tacit abdication of personal responsibility for a public duty to future generations of children embedded in current reform arguments? Is there a growing popular cultural acceptance of the notion that the privatization of childbearing means that children can be treated as durable goods? Is the direction of policy that one may choose either to buy a refrigerator or to have a child? The purchase and maintenance of a refrigerator is not subject to government subsidy, so why should those who choose not to have children be taxed, since those who choose not to buy refrigerators are not taxed? This argument is echoed quietly in many suburban communities: "Why should we pay for those who choose to have children they cannot afford to educate?"

The GINIE strategy resists the commodity argument, claiming that children cannot be equated with consumer goods. Children are supramarket. One has relationships with children, not with refrigerators. The moral duties of one generation to the next cannot be traded away. Each generation of children must learn how to successfully inherit or create and maintain both civil democracies and responsible market economies. Refrigerators do not vote.

The GINIE strategy argues that learning is primarily a public event because its consequences are relational and thus not easily privatized through property rights. Children, not refrigerators, grow up to be drug dealers. Children, not refrigerators, renew their economies. Refrigerators do not construct or maintain legitimate governments, outwit criminal gangs, or preserve the ecology.

In Sum

The GINIE project is a bold new educational development strategy that connects educational counterparts internationally through professional and community networks. GINIE is concerned about sustaining high-quality teaching internationally, especially in nations in crisis and rapid transition to democracies and market economies. The project promotes the idea that educational systems rest on networks of responsible cross-generational relationships of teaching and learning. It asserts that education is more than a commodity to be traded in the marketplace—it is a public duty to distant generations. The GINIE strategy poses the following tenets:

1. Education is a moral commitment to the protection of children's futures.
2. The education community (teachers, parents, students, and others) need to publicly demonstrate their contributions to public civility and economic innovation.
3. Education professionals bear a special responsibility to share generously information and expertise with their educational neighbors.

Resources

Those who are interested in sharing their resourcefulness with others are invited to contact the GINIE project through the Internet at www.pitt.edu/~ginie, by e-mail at ginie+@pitt.edu, by phone at (412) 624-1775, by fax at (412) 624-2609, and by snail mail at GINIE c/o IISE, 5KO1 Forbes Quad, University of Pittsburgh, PA 15260, USA.

TWO

State Financing of International Higher Education Partnerships for Trade and Development

EMILY VARGAS-BARON

Increasingly, state policymakers are becoming aware that for their states to compete successfully in the international marketplace of goods, technologies, knowledge, and ideas the funding of international higher education linkages and networks is an essential part of their states' investment strategies. Because the future of many U.S. communities is being shaped by the quality, appropriateness, and timeliness of local responses to global market forces, states are seeking to expand and improve their education systems; to develop market-driven workforce training programs; and to forge international alliances both for trade and for helping to attain sustainable social, environmental, and economic development in far-flung nations.

AUTHOR'S NOTE: This chapter does not necessarily reflect policies of the United States Agency for International Development.

International higher education partnerships include both "linkages" and "networks" that are formed to conduct common strategies to attain shared objectives. Linkages include exchange agreements between one or more U.S. institutions of higher education and one or more such institutions in foreign countries. They are often formed in collaboration with other public agencies and private sector organizations. Networks include collaborations between existing networks of higher education associations in the United States and in other nations or regions. Both of these major forms of international higher education partnerships have yielded positive results in increasing international trade, creating markets, and attaining sustainable development goals.

The Changing International Arena

As a nation, we are moving from a one-way, largely federally financed system of development assistance to two-way systems of development cooperation—of development partnerships. During the past 30 years, the vast preponderance of federal support for international development has been devoted to providing a variety of one-way aid activities, including technical assistance, training, and financing or credit programs. Little if anything was expected in return, and host nations rarely structured their programs for mutuality. In addition, earlier development assistance efforts were composed largely of federal initiatives, and relatively little state or private funding was sought or expected.

Nations in Latin America, Asia, the Middle East, and now in Sub-Saharan Africa are requesting—and demanding—to play a greater role in donor relations and coordination. They are seeking to develop active reciprocal exchange relationships with industrialized nations. Today, we are witnessing the first stage of truly global strategies for development cooperation that are built on reciprocal exchange relationships. As a nation, it is evident we are moving away from a unitary system of bilateral assistance toward shared systems of collaboration and cooperation for building development partnerships. The various creative roles of state governments and private sector institutions in international development and trade are becoming increasingly apparent.

Higher education institutions, including 2- and 4-year colleges, public and private universities, and research institutes, represent a rich resource of international programs, faculty, students, and alumni who can help to forge new international partnerships. States are becoming aware of key capacities found in institutions of higher education. State legislators and administrators are including those institutions in statewide strategies for international trade and development. Such state-level strategies usually encompass the following elements:

- Market analyses regarding industrial capacity and plans
- Resource analyses that include the higher education sector
- Plans to improve state visibility through proactive marketing of state resources
- Financial incentives and tools for promoting exports and trade
- Decentralized coordination of higher education and public and private sector organizations

Complementing state-level investments in international development through sponsoring the international programs of higher education institutions are the growing investments by city and county governments, professional associations, chambers of commerce, corporations, businesses, financial houses, and foundations. New systems of funding consortia are arising, often with federal funding playing an initial catalytic role through helping institutions to establish and nurture valuable partnerships and through providing limited seed money that is complemented by state and other sources. Businesses, corporations, and financial houses can also encourage state legislatures and agencies to invest in international higher education partnerships that they are convinced will promote trade, development, research, and training opportunities.

In the future, a significant proportion of the foreign policy of the United States will be based on, or influenced by, the complex web of international collaborations that institutions and associations of higher education are able to build. We in the United States have observed repeatedly that one-way "charity" can lead to the rejection of the giver. Solid two-way ties of mutual interest and common positive experiences tend to bind the members of reciprocal exchange

relationships, however. Higher education institutions in many nations seek to create partnerships with U.S. colleges and universities. In addition, many other industrialized nations are sponsoring such linkages as proactive ways to build their international marketing and trade. Several multilateral organizations are assisting industrialized nations to forge these new alliances. It is of strategic importance for U.S. institutions of higher education to collaborate with such linkages and to forge new ones rapidly that are focused on major development and trade issues. Major global issues include food security, basic education and workforce skills training, reduction of fertility rates, disease control, environmental protection, democratic governance, crisis prevention, emerging markets, economic growth, and international trade. Institutions of higher education in the United States and abroad must collaborate on joint action research and development programs. Special attention should be given to overcoming major development problems, which often are serious barriers to expanding markets and international trade.

Persons from developing nations who have been trained in the United States as a part of development assistance activities or through scholarship and exchange programs represent an important reservoir of talent and contacts for creating partnerships with the higher education institutions they attended. Many of these U.S.-trained specialists are now the leaders of their nations, directing major public and private institutions. Often, they are eager to build long-term exchange relationships with their former alma mater and other universities and colleges in the United States

Selected Case Studies

Higher education institutions and associations increasingly are playing a crucial role in forging international partnerships for trade and development. Various striking examples of international higher education partnerships with state support or assistance now exist. Three higher education institutions and one association program have been selected to illustrate the main points of this chapter. The Arizona case study illustrates the utility of both municipal and state involvement. The Florida example represents a comprehensive state planning

effort that includes higher education partnerships. The Washington state program demonstrates how "globalizing" university programs positively impacts economic development and international trade in a state.

Frequently, these international partnerships include one or more U.S. institutions of higher education; federal support from the U.S. Agency for International Development (USAID) or another federal agency, such as the U.S. Department of Agriculture (USDA) or the U.S. Department of Commerce; one or more state agencies; a municipal government; one or more private businesses, corporations, or associations; and one or more foundations or professional associations. When well structured, these partnerships generate considerable local enthusiasm and many activities that yield results far exceeding those of the original program design. At the state level, initiatives have included the institutional reform and development of higher education institutions; the establishment of distance learning/virtual university programs; the creation of innovative workforce training programs; the provision of investments in economic, infrastructural, and institutional development; the expansion of tourism; the creation of regional development initiatives; and even the signing of trade agreements between states and developing nations.

For a variety of reasons, some states are beginning to forge what amount to virtual foreign policies for marketing and trade in the global arena. Increasingly, these state-level initiatives should be linked with federal-level policy planning for development cooperation, global marketing, trade development, and workforce training for employment, both at home and abroad.

Arizona: Maricopa Community College District (MCCD)

The Maricopa Community College District (MCCD), a large community college system serving 18 communities and more than 177,000 students in Arizona, has boldly created multifaceted alliances called "Partners in Development" with Arizona state and municipal agencies, corporations, and hotel chains. With partial funding support

from USAID through the Association Liaison Office for University Cooperation in Development (ALO), MCCD has established thriving partnerships with a variety of institutions in Mexico and China. As a land-locked state, Arizona is making a significant effort to enter the Mexican and Pacific Rim markets, to maximize use of scarce water resources through promoting innovative irrigation programs and dry farming, and to foster active tourism.

MCCD developed a linkage with the Universidad Autonoma de Baja California Sur (UABCS) through the ALO and Mexico's National Association of Universities and Higher Education Institutions (ANUIES). They established a "long-term collaborative relationship in human resources training, international economic development and research between the two institutions, with their respective private sectors and states, to further economic development" (Landrum, 1997, p. 2).

The two focus areas selected initially were (a) the tourism and services industry, and (b) water resources management. On the U.S. side, the actors include the MCCD, State of Arizona Small Business Development Center Network, Greater Phoenix Economic Council, City of Scottsdale Economic Development Department, Maricopa Skill Center, Hyatt Hotels, Paradise Valley Community College, Scottsdale Community College, and Arizona University. The Mexican side included UABCS; State Secretary for Enterprise Development; State Economic Development and Promotion Agency, State Office of Tourism; the Los Cabos and the La Paz tourism industries, including many hotels and services; the National Water Commission; and municipal and state water commission representatives.

After an initial identification of problems of mutual concern, Arizona representatives visited Baja California and a return visit was made to Arizona. These visits included intensive discussions; site visits; and concrete planning activities including surveys, alliance formation, and assessments of training needs on both sides. In many instances, these visits constituted the first time that the governmental and private sector representatives met and considered common needs and in turn entered into discussions with education and training institutions responsible for technical training in Baja California. The results to date include the following:

- The first education, industry, and government partnerships in Baja California have been created, with UABCS joining the State Council of Tourism Development and the National Water Commission.
- UABCS has been invited to form a small business development and deregulation entity.
- Training programs have been planned in both states on low water use landscaping and water/wastewater treatment as well as hospitality programs, on how to do business in both countries, and on how to promote trade between the states.
- Future plans have been developed for linking industries, education, and government in the two states.
- Plans are proceeding for a feasibility study on water resource issues and needed educational support, a survey of employment and training needs in La Paz, further work on Los Cabos labor needs, and further exchange visits.
- Secondary schools in La Paz have agreed to add a course in tourism and water culture. (Landrum, 1997)

With regard to exchanges between the cities of Phoenix and Chengdu, China, MCCD has helped to design and conduct specialized training courses for 18 Chinese delegations averaging 12 persons each with the active participation of more than 118 Phoenix local businesses and government professionals in the training courses. Topics have covered many areas of federal, state, and city planning and services, as well as selected aspects of business development and trade (Landrum, 1995). In turn, Phoenix businesses have benefited from Chinese visits, learning about investment opportunities in China. Lacking a business office in China, the state of Arizona looks to the city of Phoenix and MCCD to help develop business and trade relationships in China, thereby supplementing state resources for international economic development.

Florida: "Enterprise Florida" and the University of Florida

In 1992, the state of Florida moved aggressively to expand its economy, increase employment opportunities and training, and improve its status in international trade and marketing through the creation of "Enterprise Florida." This coalition includes the Florida

University System, led by the University of Florida with the active participation of the state's leading community colleges; corporations and businesses; federal laboratories; and state and municipal governments and their agencies.

Enterprise Florida created the Council of Business Leaders and the Technology Innovation Corporation. The University of Florida Office of International Studies and Programs (OISP) collaborates with Enterprise Florida and provides technical services to Florida's businesses and industries. Parallel to Enterprise Florida is the Florida Linkage Institute Program of the Florida International Affairs Council, whose avowed purpose is to create linkage programs between universities and community colleges with international business partners, the state of Florida and higher education institutions abroad.

Results have included the following:

- Creation of new companies and employment opportunities
- Increased state funding for international programs linked to trade, marketing, business development, and development
- A more international outlook and preparation on the part of the student bodies of Florida universities and community colleges and an increase in departmental and professorial capacity to deal with challenges of the global marketplace
- More than 11 linkages established with partial support from the state of Florida under support from the Florida Linkage Institute Program
- A network established by the Florida Linkage Institute Program and the ALO of Latin American universities with Florida universities mutually dedicated to improving the administration and management of higher education institutions in Latin America and Florida
- Businesses and corporations assisting institutions of higher education to gain increased funding from the state legislature because they now value the technical support they receive from higher education institutions

Washington:
Washington State University (WSU)

Washington State University (WSU) boasts one of the most highly developed systems of international higher education linkages in the United States. Guided by the vision of creating a "Global Land Grant

University," WSU has forged 12 regional nodes with more than 52 university linkages in more than 48 nations. This striking dedication to international development and trade reflects not only the service philosophy of this major state university but also Washington state's role as "the sixth largest exporting state in the U.S. after California, Texas, New York, Michigan and Illinois" (Murphy, 1996, p. 5). International trade now provides employment for one fifth of Washington state's workforce, which represents "nearly 600,000 jobs" (Murphy, 1996, p. 5). Washington state's leading trading partners include Pacific Rim nations, Canada, and the European Union (EU); WSU also maintains linkages with all other world regions.

Recognizing the importance of higher education partnerships for promoting trade and development, Washington state leaders decided to provide funding to WSU for its regional education, research, and economic development networks and the International Marketing Program for Agricultural Commodities and Trade (IMPACT). These programs were established to internationalize teaching, research, and public service, as well as to provide technical guidance and research support for agricultural associations, commissions, and private firms seeking to enter world markets.

WSU has embarked on an audacious program aimed at "internationalizing its teaching research and public service/outreach programs, forging strategic alliances with public institutions and the private sector throughout the world" (*The Image of the World*, 1995, p. 1). All aspects of the university are involved in this internationalization process, from administrators to faculty and alumni at home and abroad. In all partnerships, strategic alliances are sought with state agencies and the private sector. WSU has collaborated with the Asia/Pacific Economic Cooperation (APEC) and participates actively in several APEC working groups. It also has several grants and contracts with USAID and USDA, as well as with other federal agencies; nongovernmental, business, and community organizations; and regional agencies for Latin America, Africa, the Middle East, Europe, and Russia and the newly independent states.

The five main areas of collaboration present in most WSU partnerships are

- Policy and cooperative research
- Cooperative graduate education programs

- Student and professorial exchange
- Distance education, with Internet virtual university programs
- International alumni programs

WSU has contributed actively to policy dialogue with representatives of state agencies and leaders in other nations to promote marketing and trade. As a result of its presence in such dialogues and its technical resources on agricultural and marketing matters, WSU has also played key roles in assisting state agencies with the negotiation of important international trade agreements. The university has assisted private firms and state agencies to understand foreign marketplaces and to enter into new trade relationships.

James B. Henson, the director of WSU international programs, recently commented, "Because of our orientation and interaction with the private sector, support within the state has been good." For WSU, extensive private sector involvement in higher education partnerships has been an important key to securing strong state support for WSU's global approach. Henson stated,

> Our state legislators and state government officials recognize the importance of what we are doing and are supportive of our programs. The university routinely participates in joint state-private sector trade missions and international visits. As we have greater successes and have opportunities for educating our public officials, we believe that support will continue to grow. These various activities comprise what can be termed an educational program, providing opportunities for input by a whole range of stakeholders in both the public and private sectors. They enhance private sector performance in the short, medium and long-term, while building capacity in U.S. education to respond to future needs. (Personal communication, May 1997)

New Educational Technologies: Global Virtual Universities

The Internet is providing U.S. universities and colleges, including community colleges, with the unique opportunity to provide, at low cost, extensive higher education services of excellent quality with higher education institutions abroad.

Each of the programs outlined above conducts distance higher education activities and maintains Internet web sites. In some instances, the very topic of the exchanges is learning technologies that can be used to support trade and development programs, as in the cases of Florida and Washington state. WSU provides full international university programs through interactive Internet programs, thereby enabling students to change campuses and still complete a full course of studies. Currently, more than one million students are enrolled in virtual classrooms (Gubernik & Ebling, 1997). Because of the high demand for virtual university services on the part of developing nations, it is likely that in the near future many more higher education partnerships will be formed around distance learning programs that are linked with marketing, trade, and social development issues.

Technical Support: The Association Liaison Office for University Cooperation in Development (ALO)

To create cost-effective and efficient international higher education partnerships, institutions of higher education need more than funding support from their state governments and other public and private sector partners. They also require excellent technical guidance and contacts to establish fully successful international partnerships that can be sustained until they meet all of their key objectives. The Association Liaison Office for University Cooperation in Development (ALO) was established in 1992 to coordinate international activities of six major higher education associations and their memberships of more than 2,400 institutions with USAID. The ALO provides direct services aimed at assisting the U.S. higher education community to build international partnership programs. Since 1995, the ALO has conducted five Higher Education Roundtables on development challenges, with a special focus on establishing higher education partnerships (ALO, 1995, 1996a, 1996b, 1997a, 1997b).

In addition, the ALO has led the development of three international networks and, in turn, several higher education linkages. These include a network with selected U.S. universities and community col-

leges and the Mexican National Association of Universities and Institutions of Higher Education (ANUIES) in Mexico, a network with the Florida University System and several Latin American universities, and a network between universities of the U.S. Southeast and the Carpathian region. Based on proposals from the higher education community, more networks and linkages for economic and social development will be established in the future. The ALO seeks to work closely with state governments to fulfill its mandate to develop more thriving higher education linkages and networks. Because the ALO constitutes a valuable resource for state planners and policymakers, contact information is provided at the end of the chapter.

Lessons Learned

To ensure they become important players in global educational, economic, and social development, states should channel a growing portion of state agency budgets to supporting the establishment and maintenance of proactive, innovative international higher education linkages and networks for trade and development. Through policy dialogue, states that decide to create international partnerships should establish a collaborative state policy, strategy, and plan for identifying, supporting, constituting, and nurturing strong higher education linkages and networks focused clearly on establishing international trade and sustainable development activities. Although it is relatively easy to create higher education linkages from higher education networks, it is very difficult to create a higher education network from discrete linkages not forged through an existing network. States should consider helping to establish international higher education networks as well as linkages.

State-level and private sector support can be secured subsequent to initial funding from a federal source, but to ensure comprehensive programming and sustainability it is preferable for state funding to be provided from the outset. This will help also to encourage higher education collaborations to emphasize attaining the economic and social development results that are sought by the state. Once states witness positive yields from their investments in international higher education partnerships, they tend to expand their support for such

activities. By beginning a few successful higher education partnerships, state agencies will be able to demonstrate their utility and to expand their number over time.

Some Steps for Developing Successful International Higher Education Partnerships

Experience reveals that to develop successful international higher education partnerships, the following steps should be pursued.

1. From the outset, representatives should participate in all planning, implementation, and evaluation processes from (a) all government levels (federal, state, and municipal), (b) private and service industries, (c) labor unions and professional associations, and (d) higher education and training institutions (community colleges, public and private universities, technical training schools, and secondary schools). These institutions should maintain their independence, but they should seek to build new, balanced, reciprocal relationships.
2. A shared vision and shared expectations and objectives must be identified, reviewed, and reinforced frequently. Relationships of trust must develop from this process or the partnerships will founder.
3. The benefits for all parties must be identified, reviewed, and achieved to the extent possible. Both the U.S. and developing nation institutions must achieve clear and tangible benefits in all phases of partnership activities.
4. State funding, agency and legislative representation, and lines of communication should be established from the outset, if possible. It is advisable to establish a state council for international higher education partnerships for trade and development that has representatives from all sectors listed above. The council should be empowered to help create new partnerships, guide existing ones, and disseminate information about its activities. In some instances, the council could be given the responsibility for managing a partnership development fund created by the legislature, municipal governments, corporations, and other private sources. This fund would provide grants and contracts to proposed and existing partnerships. In other instances, specific state agencies or existing associations may be given the respon-

sibility of managing such a partnership development fund. The fund should include counterpart support from other governmental and private sources.

5. Face-to-face exchange visits and meetings must be carried out periodically in each locale, and they should always involve the active participation of state and local decision makers. It is not enough to exchange e-mail messages or to conduct teleconferences. Personal relationships lead to interpersonal commitments and the achievement of shared goals.

6. A concrete partnership development program must be established by all parties. At a minimum, it should include key strategic priorities in the following areas:

- Trade, marketing, and social development activities
- Education and training programs in the state and abroad
- Focused research, assessments, or studies on key aspects of the collaboration
- Course development on topics of mutual interest
- Provisions for shared internal and external evaluation and monitoring

7. The action plan for the partnership development program should have clear action steps, list all responsible parties, and provide deadlines for the completion of activities. At the same time, it is essential for the program to maintain flexibility, ensure the timely execution of activities, and retain the capacity to revise plans in light of emerging opportunities or problems.

8. Periodically, all partners must assess their own and others' participation and achievements. All partners must use these assessments to help them plan their future action steps. By sharing the roles of evaluation and accountability, the parties are more likely to search together to achieve efficiencies and effectiveness.

9. Additional partners may join existing partnerships to round out institutional capacities. For example, this type of flexible development cooperation may help to [illegible]e land grant colleges with community colleges and private univer[illegible]ties for partnerships to meet resource needs in other nations and to spread learning opportunities across the faculty and students of several campuses. This complexity will require the fast-paced prioritization of activities and the development of

timely response systems. Virtual universities and Internet linkages will assist with the management of these mushrooming partnership systems. State governments that begin to harness these far-flung systems may well develop more competitive systems for increasing state trade and economic and social development.

What Are Some Benefits of State Higher Education Partnerships for Trade and Development?

Active engagement in international development through higher education linkages and networks helps to promote the "deparochialization" of state governments and enterprises. International partnerships help states to forge successful long-term international agreements for mutual development. The participation of higher education institutions assists all involved to promote intercultural understanding and to develop the knowledge and skills that humanize relationships for trade and development. State administrators, businesspeople, and professors who engage in developing higher education relationships usually report they feel more effective in conducting international relations. Higher education partnerships positively affect many faculty, administrators, and students, thereby helping them to become responsible and culturally competent actors in global trade and development.

Higher education partnerships will assist states to achieve increased economic growth and international trade and marketing. The social and economic development programs that result from higher education partnerships will assist less developed nations to prosper and to achieve the status of "emerging markets."

Conclusion

Fundamentally, as with traditional societies, reciprocal relations at the international level can form a solid base for promoting socially responsible and economically successful market exchange. Increasingly, institutions of higher education are becoming leaders in forging

the groundwork for foreign policy, development cooperation, and international trade. Because of the globalization of the U.S. economy, it is influenced negatively by crises, violence, and economic disruption in developing nations. With more than 33 nations in crisis as of this writing, and a fourfold growth in expenditures for humanitarian and military assistance, the avoidance of national and regional warfare is essential. Through creating strong economic and social ties for mutual development by improving and expanding basic education and skills, many of the requisite conditions for long-term stability and sustainable development will be established. The higher education community is an essential "motor" for the creation of innovative partnerships for trade and development.

Increasingly, leaders in state governments are becoming aware that for their economies to progress, they must look to resources in the higher education sector to help them increase trade and compete successfully in the global marketplace. Wherever possible, it is advisable for states to promote strong partnership activities for trade and development. It is in the strategic global interest both of the United States as a nation and of the individual states to engage in cooperative activities with institutions of higher education devoted to promoting international trade and development.

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The American Council on Education (ACE)
The American Association of Community Colleges (AACC)
The American Association of State Colleges and Universities (AASCU)
The Association of American Universities (AAU)
The National Association of Independent Colleges and Universities (NAICU)
The National Association of State Universities and Land-Grant Colleges (NASULGC)

THREE

Education, Technology, and the Social/Economic Order

SREBREN DIZDAR

CECILIA WANDIGA

This chapter examines research that illustrates the link between education, technology, and economic growth. Discussion centers around unanswerable questions and issues in the hopes of both promoting debates and focusing future research not on solutions but on the dilemmas and complexities arising with the dawn of a new age.

The Social/Economic Order of Things

If by some means we could create a tabula rasa for all countries today, thereby making them all equal, what would enable some countries to advance faster than others? Thus far, there have been four main ways or theories as to how this would come about: developmentalism, evolutionism, economics, and education.[36]

Developmentalism:	*Evolutionarism:*
A country's advancement is determined by its rate of natural progression through a predetermined set of stages. E.g.: crawl-walk-run agrarian-industrial-post industrial	A country's advancement is guided by the rate of proliferation of a trait(s) that increases adaptability to the existing environment. E.g.: the use of technology to modify one's surroundings seems to dominate in colder climates, where the consequences of not having such a trait are much more immediate
Economics:	*Education:*
A country advances according to the use/allocation of its resources. E.g.: the right combination of capital investment, natural resources, human capital, trade regulations, fiscal policy, etc.	A country's advancement is dependent on its ability to develop an educational system that generates and maximizes intergenerational wealth transfer. E.g.: the transfer of technical/production know-how, entrepreneurial skills, applied technological know-how, etc.

Figure 3.1. Theoretical Paradigms for Economic Growth

After World War II, it became necessary to rebuild the great powers of Europe and repair the damages done to Japan. This issue of how to best and most effectively promote development in a country created the field of development economics. Initially, developmental assistance came exclusively in the form of capital (either monetary or machinery) transfers. The main focus of relief efforts was to replace what had been lost during war. Around 1960, the European powers found themselves largely restored, albeit without the majority of their former colonies. Additionally, there were now two new forces in the arena of global supremacy: the United States and the Soviet Union. The birth of the United Nations had also imposed a new civility on the world order, and it was no longer proper etiquette to dominate the world through colonialism.

During the Cold War, the world once again divided into allies and foes, with allies being either prodemocracy or procommunism. Since

the economically advanced countries were on a relatively similar footing in strength, they were left with no choice but to turn to the less developed countries to expand their "spheres of influence." The key to this expansion was hidden under the guise of humanitarian relief, and the field of economic development was popularized. Through the popularization of humanitarian relief, a "holy crusade" aimed at spreading the knowledge and resources from the developed countries to all other nations. Almost 40 years later the developmental holy war can also be deemed a failure.

With the exception of a few converts such as the TIGER[1] countries in Southeast Asia, the rest of the underdeveloped world remains largely or comparatively underdeveloped. Granted, there have been many improvements, most notably in areas such as health. Additionally, even underdeveloped countries have experienced growth, many times significant growth. For example, according to the 1995 World Bank World Development Report, Nepal experienced an average annual growth rate in gross domestic product (GDP) of 2% from 1970 to 1980 and 5% from 1980 to 1993; China experienced a growth of 5.5% from 1970 to 1980 and 9.6% from 1980 to 1993; yet they are classified as low-income economies, despite the fact that all the high-income economies, with the exception of Australia, the United Kingdom, and Switzerland, experienced a decline in average annual GDP growth over the same period. Unfortunately, this growth has failed to translate into the transition from poverty to wealth for the majority of underdeveloped countries.

Today's answers to the question of what makes some countries advance faster than others are (a) their ability to develop and adapt new technology (note that this was the explanation originally offered by evolutionarism), and (b) their ability to educate their workers on how to develop and adapt such technology (education theory revisited). Before accepting these theories at face value, we must examine whether there is any evidence to substantiate either of these approaches.

A Brief View of Current Research

The Effects of Education

Although there is a vast body of research on the issue of what makes an education system effective,[2] there is very little research that proves

a direct link between improvement in education and economic growth, let alone development (see Smelser & Swedberg, 1994, pp. 581-199).

When examining any system, it is important to consider both the *intra-effects* and the *inter-effects* of its subcomponents. The intra-effects are any changes (or lack of change) to the overall system caused by various parts of a system. For example, any education system has the following components: finance/spending, classroom size, student-teacher ratio, subject matter, teaching methodology, number of classroom hours, administrative personnel, equipment and materials, and educational attainment. Consequently, any examination of what makes an education system effective thereby focuses on the intra-effects, for example, what effect does increased spending have on educational attainment as measured by SAT scores?

The Economist (1997) compared intra-effects in educational systems across countries. The research assumed that the economies were a result, at least in part, of the educational system—that is, causality was a foregone conclusion. This may or may not be the case. For example, U.S. per pupil spending is more than three times as much as that of Hungary, and yet Hungary outperformed the United States on both the math and science Third International Math and Science Study (TIMSS) tests (*The Economist*, 1997, p. 21). If one were to follow the logic of the underlying assumption, one would expect to find that Hungary's economy outperforms that of the United States because its education system is superior. The 1995 World Development Report, however, classified Hungary as a middle-income economy and the United States as a high-income economy. This is one indication that the strength of a country's education system may not have a direct bearing on its economic status. Such results are disturbing when one considers that current education reform rhetoric in most First World countries promulgates the assumption that a top ranking in educational performance tests will lead to a top ranking in economic performance tests. The reality is that a myriad of factors affect the status of an economy, and education is just one of those factors.

In light of this, we must then consider the inter-effects of education on the economy. The inter-effects are any changes the system or its subcomponents cause on other systems, for example, the effect of educational attainment on economic growth. Research conducted by Richard Rubinson and Irene Brown shows the following:

1. Increases in enrollment lead to increases in economic growth when the increases in enrollment are the result of a demand for new or improved skills but not when the changes in enrollment are the result of social measures aimed at reducing class biases or differences, for example, affirmative action policies.
2. The quality of schooling, when controlled for time-on-task (the amount of hours spent learning), does matter for economic growth but only to the extent that there is a direct link between the type of training and the skills needed in the economy.
3. The effects of education on economic growth are a function of the link between the level of schooling provided and the sectoral distribution of the economy. For example, if an economy is dominated by low-skilled, labor-intensive sectors, then schooling aimed at producing such skills will increase economic growth, whereas other types of schooling will not; in other words, the economy determines the type of schooling that should be provided.
4. Cross-national studies of education show that there is much more similarity among educational systems than one would expect given the corresponding sectoral variations in the economies studied; therefore, a plausible conclusion is that political processes dominate the effects of education on the economy in that they impede the necessary feedback, from the economy to educational systems, that would enable greater variation to occur. (Smelser & Swedberg, 1994, pp. 594-596)

Thus we can see that (a) education does affect economic growth, and (b) the important issue is not to find out which economies have the better schools but rather to determine under what conditions education does affect economic output. The question that remains is, If it is true for all cases that for economic growth to occur the economy must dictate the type of schooling provided, how can a country create the type of economy it desires and simultaneously train its labor force without sacrificing economic growth?

The Effects of Technology

Depending on how technology is defined, there is either a little or a lot of evidence to show that increased technology leads to increased economic growth. If one limits one's definition of technology to a particular machine or revolutionary production approach, technology's contribution to economic growth then becomes limited to the

longevity or usefulness of that particular machine or production mechanism. For example, the spinning wheel, although largely instrumental in England's economic growth during the 14th to 16th centuries, is absolutely irrelevant to England's economic growth today. But if one defines technology as the "totality of methods rationally arrived at and having absolute efficiency (for a given stage of development) in every field of human activity" (Ellul, 1964, Note to the Reader), then the evidence can be traced back as far as the history of humankind. In the field of economics, Adam Smith is credited with first noticing that productivity and efficiency increased through the division and specialization of labor. In other words, if we input humans into an economic equation with the variable name "human capital," their ability to produce will depend on "the totality of methods rationally arrived at and having absolute efficiency (for a given stage of development)."

Robert Reich (1992) defines technology not as a particular piece of machinery or a revolutionary technique but rather as the ability to develop "the skills and insights necessary to *continue* to invent" (p. 152) in an efficient manner. Technology as thus defined affects the rate at which goods can be produced in a given economy, and this in turn affects the rate at which an economy grows (assuming, of course, that the goods being produced are in demand and can be traded). Ellul (1964) also wrote,

> When technical progress intervenes, it modifies not only the application of economic laws but also the essence of the laws. We may consider this in two ways. First, economic laws are not eternal like the laws received by Moses on Mt. Sinai. Our economic laws are valid only for a certain type or form of economy. When technical progress occurs, it is integrated into the economic system not as a foreign element but organically. Technical progress is a part of the essence of an economic system, not a mere accidental event. . . . When the facts change, the constants as well as the laws, are modified. . . . In fact, technique has modified the scale of human economy, and the laws that held for the average economic system at the beginning of the nineteenth century no longer apply in the new scale of the economy we know today. . . . Just as technique breaks down the barriers between economic sectors, so an economy based on technique tends to burst asunder the traditional sociological frameworks. (pp. 204-205)

In his (1995) book *The End of Work*, Jeremy Rifkin illustrates how in the 1920s technology had the following three effects: (a) a technological dilemma—rapid development of labor-saving techniques—very similar to that which we are facing today with the profusion of computerization; (b) increased productivity, which affected the economy as a double-edged sword—on the one hand increasing productivity and output while on the other sometimes reducing the number of jobs; and (c) mass production, which created a need for mass consumption—thereby reinforcing Ellul's (1964) statement, "Just as technique breaks down the barriers between economic sectors, so an economy based on technique tends to burst asunder the traditional sociological frameworks" (p. 205). The question then becomes, What effect is technology having today?

The Effects of Globalization

Most economists would agree that computer and telecommunications technology has pushed modern society to the brink of another industrial revolution. Although the exact nature of this revolution remains nebulous, or at least best defined as *globalization*, its effects are already being felt, and many more effects are anticipated. The effects already visible include the following:

- *Unprecedented speed in the area of communications.* The technological revolutions taking place with fiber optics, computers, and software now enable us to transmit data and graphic information faster than most of us can imagine. For example, Texas Instruments (TI) makes the following claim: "TI also is a leading supplier of asynchronous transfer mode (ATM) technology, a sophisticated switching technology that can route streams of multimedia traffic at mind-boggling speeds (it will be able to transmit a 3½-hour movie, such as *Gone With the Wind*, in 84 seconds)" (Texas Instruments, 1995).
- *A shift from the importance of ownership of natural resources to the importance of efficiently developing natural resources.* In *The Work of Nations*, Robert Reich (1992) points out, "The increasing dominance of Japanese automakers within the United States is due largely to the fact that they have been able to utilize American workers to make a higher-quality car, in less time than can American-owned automakers. Although the 1990 *Consumer Reports* ranks most Japanese cars higher in quality than American cars, it finds no difference

between the quality of Japanese cars produced in the United States and the quality of Japanese cars made in Japan" (p. 146).

- *Unprecedented speculation in world financial markets (largely enabled by high speed communications).* According to John C. Edmunds (1996), "Securitization—the issuance of high-quality bonds and stocks—has become the most powerful engine of wealth creation in today's world economy. Financial securities have grown to the point that they are now worth more than a year's worldwide output of goods and services, and soon they will be worth more than two years' output. Historically, manufacturing, exporting, and direct investment produced prosperity through income creation. Wealth was created when a portion of income was diverted from consumption to investment in buildings, machinery, and technological change. Societies accumulated wealth slowly over generations. Now many societies, and indeed the entire world, have learned how to create wealth directly. . . . The total dollar value of all investment-grade securities worldwide that could potentially be issued is upward of $150 trillion, roughly five times the value of annual world output. The value of all quoted securities was $35 trillion at the end of 1992. This value will approach $60 trillion by late 1996 and surpass $83 trillion by the year 2000. Therefore, only 40 per cent of these securities have been issued so far. More are being issued every business day, and their value on the whole is increasing" (pp. 118, 120).

- *The emergence of a new player in world power—financial rating institutions.* Previously, power lay in the hands of those with either economic or military might, but financial rating institutions are now beginning to use their ratings as a leveraging tool to dictate the actions of governments. It should be alarming to education finance professionals that the authority behind national fiscal policy making is being transferred from elected bodies politic to private for-profit investors. In February 1995, Moody's Investing Service threatened the Canadian government with a lowering of its credit rating unless it adopted "tougher" fiscal policies (Wiens, 1995, p. 17). During the U.S. budget impasse in January 1996, matters appear to have been more expediently resolved after Moody's "threatened to downgrade the rating of $387 billion in U.S. bonds . . . [because] the impasse on the budget and debt had 'significantly increased the risk of a default'" (*U.S. News & World Report*, 1996).

- *Rising unemployment levels worldwide.* Just as electricity increased productivity and efficiency in the U.S. automobile industry during the 1920s, the computer is increasing productivity and efficiency today. Human capital is being replaced with machinery, and unemployment levels are rising. According to Jeremy Rifkin (1995), "In the Organization for Economic Cooperation and Development (OECD) countries, 35 million people are currently unemployed and an additional 15 million 'have either given up looking for work or unwillingly accepted a part time job.' In Latin America, urban unemployment is more than 8 percent. India and Pakistan are experiencing unemploy-

ment of more than 15 percent. Only a few East Asian nations have unemployment rates of below 3 percent" (p. 198).

• *A need to create "new" or* emerging *markets for the consumption of surplus goods.* One way of increasing economic growth is to find ways to increase consumption, because it can guarantee economic growth in production; consumption can be stimulated on the domestic front or abroad. During the colonial era, the colonizing countries (e.g., England, Spain, Portugal, France, etc.) extracted raw materials from their colonies (e.g., India, Kenya, the Philippines, Argentina, etc.); processed these materials into goods such as clothing, tea, and chocolate; and sold them back to the colonies or within their domestic borders. Today, saturated "domestic" markets with rising unemployment levels create the need for rapid economic growth elsewhere, thus making underdeveloped nations a prime target for the consumption of industrialized goods. The late U.S. Secretary of Commerce Ronald H. Brown made the following statement at the opening session of Big Emerging Markets (BEMs)[3] Conference in Washington, D.C., on July 24, 1995:

> The BEMs were experiencing rapid economic growth, and exports have been a major source of new high-wage jobs in the United States. In fact, since 1987, exports have contributed over one third of the overall growth in GDP, rather impressive since exports are only 12 percent of the economy. Export-related jobs have increased at six times the rate of domestic employment growth. Given the Clinton Administration commitment to restoring opportunity to all Americans, job creation is our chief objective. And exports clearly are the key. While trade with our traditional partners in Europe and Japan was still crucial, these are mature economies, growing slowly. So, we looked to emerging markets and found vitality. We found that in the largest of the emerging markets not only had the decade just past brought tremendous growth, but the decades ahead offered even greater promise. (Big Emerging Markets (BEMs) Home Page, 1995)

• *A collapse of the social welfare engine and, in response, the rise of nongovernmental organizations (NGOs).*

> The independent sector [NGOs] is playing an increasingly important social role in nations around the world. People are creating new institutions at both the local and national levels to provide for needs that are not being met by either the marketplace or public sector. . . . England's experience is closest to that of the United States: it has thousands of volunteer associations, . . . There are currently more than 350,000 voluntary organizations in the United Kingdom, with a total income in excess of £17 billion, or 4 percent of the gross national product. . . . In France, the third sector is just now beginning to emerge as a social force. In one recent year, more than 43,000 voluntary associations were created. Employment in the third sector has been growing lately, while jobs in the formal economy have been declining. The social economy now accounts

> for more than 6 percent of total employment in France, or as many jobs as are provided by the entire consumer-goods industry. (Rifkin, 1995, pp. 275-286)

Rifkin reports comparable figures for Germany, Italy, Japan, Eastern Europe, Central Europe and the former Soviet Union, Pakistan, Sri Lanka, South Korea, Bangladesh, Nepal, Indonesia, Korea, Peru, Brazil, Dominican Republic, Colombia, Mexico, Burkina Faso, Kenya, and Zaire.

- *Bi-modal economies.* The shrinking of the middle class in many countries across the globe is stirring fears of a return to feudalistic days during which there were only two classes—the filthy rich and the dirt poor. Robin Broad and John Cavanagh have observed,

> Thirty years ago, the income of the richest fifth of the world's population combined was 30 times greater than that of the poorest fifth. Today, the income gap is more than 60 times greater. Over this period the income of the richest 20 per cent grew from 70 to 85 per cent of the total world income, while the global share of the poorest 20 per cent fell from 2.3 to 1.4 per cent. The number of billionaires grew dramatically over the past seven years, coinciding with the spread of free-market policies around the world. Between 1987 and 1994, the number more than doubled from 145 to 358. According to our calculations, those 358 billionaires are collectively worth some $762 billion, which is about the combined income of the world's poorest 2.5 billion people. At the bottom, 2.5 billion people—approximately 45 per cent of the world's population—eke out an existence using just under 4 per cent of the world's GNP. At the top, 358 individuals own the same per cent. (pp. 26-27)

- *Centralized versus decentralized government control.* In the face of the current social and economic transformations caused by globalized systems, governments are struggling to find the most effective way of maintaining control and allocating resources. In the United States, emphasis is being placed on centralization or nationalization. According to Lester Thurow (1992),

> With the collapse of much of its banking sector, by early 1991, the American government had been forced to take over two hundred billion dollars in private assets and was expected to end up owning three hundred billion dollars in private assets before the hemorrhaging stopped. A government corporation, the Resolution Trust Corporation, has become by far the largest owner of property in America. (p. 16)

Centralization is also happening in the field of education with the promulgation of national education standards led by the newly created National Center on Education and the Economy. Paradoxically, Europe is simultaneously attempting to centralize regional efforts through the creation of the European Union (EU) while decentralizing utility companies and government services

(England); educational systems (France); and, in the case of Eastern Europe, the entire economic structure.

- *Globalized education reform.* Over the past 10 years, governments have begun paying close attention to cross-national educational attainment ratings. Once results are released, virtually every industrialized country undertakes some level of educational reform aimed at maintaining its status or improving the next set of scores. The U.S., French, German, British, Hungarian, Japanese, and Swedish governments, to name a few, have all put pressures on their schools to improve teaching methods, lengthen hours, stress math and sciences, or implement any one or more of a myriad of policies. Underlying this reform effort are two beliefs: (a) "education is the key to getting rich—for countries as well as for individuals," and (b) as governments make "desperate attempts to rein in public spending . . . there is no prospect that governments will chuck money at schools without checking to see whether standards are improving" (*The Economist*, 1997, pp. 21-22).

From Research to Reality: Developing an Ideological Framework

We previously pointed out the difficulties involved with analyzing components of this highly complex system. We would, however, be remiss if we failed to illustrate the issues discussed in their proper contexts. The following three questions attempt to illustrate the shortcomings of current conventional education finance wisdom in order to redirect research and debate toward a more comprehensive approach. Given that we are currently in an age of transition, it is helpful to acknowledge the possible effects change may have on societies. Figure 3.2 below is a gross generalization of these effects.

The figure points out that as the rate of change accelerates, flexible societies tend to encourage reform measures as a form of adaptation, whereas rigid societies tend to encourage preservation of existing measures (or "tradition"). Also illustrated is the fact that flexible societies tend to prosper in stable environments (i.e., stable political, economic, and social structures), whereas rigid societies are frequently a reaction to crisis environments. Thus, in examining education finance policies and measures adopted in any given country, region, and so on, care must be taken to situate the given entity in the appropriate environmental context. Without this understanding, it becomes very easy to slip into a chastising mode (i.e., District X would

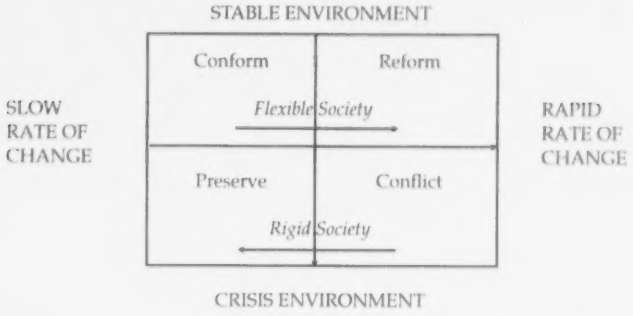

Figure 3.2. Anticipated Effects of Environment on Societal Change

achieve greater achievement if only it would implement policies such as those used by District Y) while forgetting that the behavior of the district in question is most likely the result of its particular environment and not just the district's actions or lack of actions. The purpose of this chapter is only to spark debate that reminds of us of our highly complex environment. We will, therefore, leave the details and examples of this model for future discussion and proceed with the examination of other key issues.

Who Pays? Who Controls? Who Benefits? Who Rates?

An overarching concern raised in complex transitional environments, particularly in light of the rise of nonprofit educational organizations and the reliance on securing debt as a means of accumulating wealth, is, where does the center of educational finance control or decision making lie? The social contract theory (in all of its varying forms) developed by Jean Jacques Rousseau, John Locke, and Thomas Hobbes maintains that individuals make a conscious and deliberate decision to surrender their individual freedom to the laws that govern a collective whole in the hopes of obtaining a more orderly and profitable (in the philosophical sense) existence. For example, even though we all could find plenty of alternative uses for our money, the majority of us pay taxes to a collective fund based on the belief that

there are a number of necessary social goods (e.g., safety, education, roads) that make our existence more palatable but that we cannot afford to pay for as individuals. To better understand the complex influences on education finance policy in the United States, it will be important to examine post-Cold War influences on education finance in other parts of the world.

Education Finance as Social Control

Until now, the responsibility for administering these collective funds has been placed in the hands of governmental entities that, elected or not, have largely been able to appropriate their use in a relatively independent fashion as a mechanism for social control. As a result, the basis of governmental power and influence has largely rested on the fact that funding streams can make entities behave according to a prescribed modus operandi. For example, when the Pennsylvania Department of Education decided to establish a computerized link between all of its 401 school districts, a number of rural districts resisted the attempt, claiming that the network was "an artifact of the devil sent to corrupt the purity of their existence." After various attempts, the department finally succeeded in getting these districts to use the network by placing all budgetary information exclusively in electronic format. The ability of social control mechanisms to "fog the minds of men" is exercised by governments all over the globe. Education finance professionals cannot afford to lose sight of the importance of funding streams as a social control mechanism.

In European traditions, the state intervenes on behalf of an imaginary "public good" (the commonwealth). Depending on the level of democratic achievement, these funds are often used for a "good cause" (e.g., socialized health care and welfare benefits) or as a "bribe" against various competing interests (e.g., funds are now being used to buy a social peace in the EU and to direct changes in the former Soviet bloc countries). This intervention holds true in both Eastern and Western Europe.

In Western Europe, after the tragic experiment of fascism and Nazism, there were few attempts by educators to address issues of collective responsibility and funding. The emphasis shifted instead

toward individualism. This emphasis on the alienation of individuals, so popular in post-World War II European existentialism and later in the U.S. "beat," "hippie," and "yuppie" cultures, masked critical issues of collective responsibility and public duty. Collective action was often limited to the labor and civil rights movements. This shift to individualism created a merit metaphor that was used to help shape education finance policy as a social control mechanism. For example, a post-World War II system of intermediary schools was introduced in Britain for the most talented individuals from working-class backgrounds. Traditionally, higher education had been reserved for the elite: Lawyers reproduced lawyers, doctors reproduced doctors, and so on. With the reform, a new kind of educated class from a working-class background infused fresh blood into the traditional professions and, eventually, strengthened them.

In the United States, the GI Bill was also used as a social control mechanism to help open up economic opportunities traditionally reserved for elites through limited access to higher education. The civil rights movement spawned a rising class of African Americans who made their way through the education system and became established as an example of "equal" opportunities within the white Anglo-Saxon Protestant (WASP) society.

In contradistinction to the Western European and U.S. obsession with individualism, Eastern European culture emphasized the collective. Education was proclaimed as the all-important tool or vehicle for conquering nature and an unjust past. Education, previously reserved for family elites, became an exclusive privilege granted party loyalists who were recruited from peasant and industrial worker backgrounds. Education was thus used as a way of strengthening party dominance over historical elites. The children of the former educated elites from bourgeois backgrounds were widely discouraged from studying in the country, so many fled abroad. The remaining found their way through the system with great difficulty. Many who dared to protest lost their good jobs and were assigned to dirty manual tasks (the current Czech president Havel suffered from this discrimination).

By the late 1960s, these tensions had somewhat eased. More universities opened with the sole aim of preventing further unemployment increases in Eastern Europe. At the same time, these countries borrowed heavily from the West to "catch up" with the developed world.

The result of living on debt was the collapse of industrial giants such as East Germany, Poland, and Czechoslovakia in the late 1980s when no more foreign loans were available to boost the rundown economy. The Soviet empire fell in large part because of its economic inefficiency. It also caused myriad social upheavals (first in Poland, then in Romania and Czechoslovakia and Hungary, and currently in Bulgaria and Albania). The education finance systems in each country underwent traumatic changes. There was little money to support growing numbers of students, the quality of teaching declined dramatically, and even if students graduated from a university there were few jobs available—not only prestigious jobs but any jobs. In the Ukraine, links between education and access to the legitimate economy were so badly damaged that many students refused to pursue higher education.

In some countries (Hungary, the Czech Republic, and to some degree Bulgaria), foreign interests, either governmental or private (such as the financier George Soros), wanted to see major changes in education finance policy. The communist system proved to be inflexible. It had always been traditional and centralist and was unable to reform itself. No longer were there state funds to provide necessary supports. The academic communities were ready neither to propose major changes to survive nor to redirect a course into the 21st century. Critical complicating matters included uneven international funding streams. Albania is a singular case in point. Albania almost received an influx of needed financial aid early in the 1990s to reconstruct its education system. Unfortunately, the Balkan war shifted the world political interest to Yugoslavia and, consequently, Bosnia and Herzegovina (BiH). Now, with Bosnia somewhat pacified, Albania has finally attracted attention, but only as a result of the latest unrest. Bloodshed and human suffering play a major role in determining international education finance policy.

Albania and BiH are small. Russia itself is a source for future unrest and conflict, and post-Deng's China may face the same difficulties. These situations are vital to U.S. interests, but they are not media-visible to its citizens. One education finance colleague reports the suppressed news of starvation among the elderly in Russia. Starvation is tough competition for taxes to pay for schooling.

Education in Eastern Europe collapsed overnight when there were no stable revenue sources. When the very foundations of revenues

became too weak to support even the most basic needs, let alone services, people suddenly realized education was not the tool of progress. It does not provide for a good, or even decent, living any more. Many young people have lost faith in education as a fair opportunity to enter the legitimate economy. Democracy and market economies have brought hope to many; now it is up to education professional colleagues around the world to help each other learn how to live successfully within them.

Education Finance in a Retreating State

Today, as national fiscal policy-making authority shifts from political bodies to financial institutions, ratings, and stockholder whims and fancies, one cannot help but wonder, in light of the historical context provided, about the possible social consequences of this new style of decision making. Weak governments make weak regulations. Decentralization has been an efficient means for dividing governments and weakening their fiscal regulatory capacities. It seems as if we will now be forced to make hard-and-fast decisions on the old economic debate over what is best: government control or unfettered market action. Although the best alternative is probably a compromise between the two positions, the question still remains as to what the delineation of such a compromise would look like.

In other words, should resources be allocated according to "ability to pay" or "ability to benefit"? Or, if both ability to pay and ability to benefit are factored, what should be the proportion between the two? For example, should education be paid for through tax revenues (based on societal benefit) or corporate revenues (based on economic growth)? Or, if both are used, what portion of education should be paid for through taxes and what portion of education should be paid for through corporate revenues? In light of this, who determines curricula, those providing the funding or those performing the rating?

Furthermore, when government funding streams (or any other revenue source) collapse, what becomes of the systems they were supporting? Should laissez-faire policies be adopted in the hopes that these systems will rebuild themselves, or should some form of strategized intervention take place? Last, will private funding streams

allow or enable the same degree of social equalization attempted by government funding, or will they only serve to augment the inequalities that already exist?

Education for High Technology Skills for All: Our Salvation?

As economies become increasingly interlinked and countries struggle to maintain their competitive advantage under the pressures of globalization, heavy emphasis is placed on the development of high-tech skills among the general population. Left out of the equation are those such as artists, philosophers, social theorists, and believers in a broad educational base as essential for civility and innovation. Also overlooked is the fact that education may not be the only contributor to economic growth. In other words, it is not very difficult to conceive of situations in which substantial amounts of economic activity are being generated by individuals with low education levels, for example, professional athletes, celebrities, or criminals.

In light of this dilemma, schools are faced with determining how best to train students for tomorrow's society. It is our belief that the price of democracy is civility, and that civility means a well-rounded and broad-based educational background to manage modern complexity. Instead of learning subject matters as discrete entities, students should learn the interdisciplinary nature of the material as it is used by professionals. For example, to design a good building, an architect must draw upon the following fields: art (for the aesthetics of the building), structural design, physics (to determine the appropriate materials for the climate, etc.), math (for the calculations), sociology (for an understanding of how physical structures affect human behavior), history (to determine what cultural aspects the building will represent), geography (for terrain issues), horticulture (for landscape design), and business management (to oversee the project, control costs, etc.). Architecture is not the only profession requiring a multidisciplinary background. As a matter of fact, one could argue that all professions could benefit from the knowledge base of other subject matters. Unfortunately, just as obligatory simplification of pedagogy obfuscates the complexities of professional judg-

ment, interdisciplinary links tend to get overlooked in the classroom environment. Education is more than the acquisition of skills for a "good job." It is an apprenticeship to civilization.

Our recommendation for schools is that classes should be structured in such a manner as to expose students to interdisciplinary linkages. This approach is not new and is used in many classrooms around the globe. The modern educational metaphor of machine efficiency as a standard of perfection creates "human computers," individuals capable of performing complex quantitative analyses but void of the ability to engage in moral/philosophical debates. We would like to encourage schools not to abandon the interdisciplinary approach that confronts both science and justice in the rapidly changing and globally interconnected society that is now emerging. The biggest source of educational intergenerational wealth transfer will not stem from a limited skills base (i.e., high tech) but from the social capital of civility and innovation. This requires a more thorough and complete understanding of each individual's and country's contribution to and place in the global infrastructure. The most daunting obstacle confronting schools and governments alike is finding a way to ensure that every individual receives an appropriate apprenticeship to civilization. Although we cannot control for individual aptitudes and ambitions, we must begin to find ways to provide everyone with a minimum set of social and economic skills before the increasing divide between rich and poor becomes so ineradicable that we give up on our long-standing hopes of poverty amelioration.

Globalization Versus the Decentralizing State: Increasingly Fragile Boundaries

Another quandary emerging as communication speeds shorten the distances between countries and regions is how or where to allocate human capital. Truly liberalized trade calls for a free flow of all commodities, including humans. We have already seen how monetary resources can now be readily transferred across boundaries and the resulting effects of this in processes such as securitization. So too has the mobility of human capital affected education finance. On observing such a phenomenon, one would be inclined to think that

traditional nation-state boundaries no longer matter. Nonetheless, they happen to remain firmly in place. Even among regional trading blocks such as the EU, there is still a strong resistance to uniform standards of language, currency, labor laws, and so on. Although countries seem quite willing to benefit from the positive terms of trade offered by globalized resources, their willingness stops when these resources begin to affect anything considered inherently nationally characteristic such as language, culture, and the like. Furthermore, there is an even stronger backlash when flows of human capital exceed some unidentified tolerable level. French hostility toward West African immigration has led to the warehousing of these immigrants in communes with conditions deplorable enough to attract the attention of the international news media. In Germany, hostility to immigrant groups such as the Turks has escalated to violent levels echoing less enlightened periods of the country's history.

Even a country built by immigrants such as the United States is adopting a tougher stance on its immigration policy. This occurs regardless of the skill levels of the groups that are immigrating and regardless of the economic benefit received from the activities of such groups. In the Spring 1996 issue of *Foreign Policy*, John Stremlau provides a case study of Bangalore, India, that highlights the debate behind this stance. Bangalore is rapidly becoming a software production center, rivaling and, according to the Capability Maturity Model developed by the Software Engineering Institute at Carnegie Mellon University, even surpassing most Western software production centers. Stremlau notes,

> Citibank, American Express, General Electric, IBM, Reebok, Texas Instruments, Hewlett-Packard, AT&T's computer unit—NCR—and Compaq Computer are but a few of the many companies that depend on computer software developed and tailored to their needs in Bangalore and other Indian cities. . . . During the 1980s, Bangalore's main software-industry exports were not products, but people: high-skill, low-wage software engineers and programmers who took jobs in the United States, a process Indians call "body shopping." It is often said that India boasts the second-largest scientific community in the English speaking world—more than 3 million scientists and technicians. There are approximately 140,000 Indian scientists of all disciplines cur-

rently working abroad. Each year, the number of computer-science graduates from Indian universities averages around 15,000, and many go to the United States.

The hiring of foreign programmers by U.S. companies recently became a contentious topic in Congress. In 1995, legislation[4] was proposed that would significantly limit the number of American visas issued to foreign workers. . . . The export of semiskilled American jobs is not new. But thus far, American blue-collar workers have borne the brunt of these job losses. Workers in Bangalore, however, are not doing the routine assembly of circuit boards, as in Malaysia, nor are they doing only the mind-numbing work of data processing and minor software repair. Increasingly, Bangalore's engineers are designing the software programs that tell computers what to do. And American white-collar workers with annual salaries of $40,000 or $50,000 suddenly find themselves competing with equally well-trained and experienced computer programmers in Bangalore who often make less than $10,000 per year. (1996, pp. 152-168).

Unfortunately, as Stremlau proceeds to explain, the benefits to Bangalore are not as great as one would expect. Foreign corporations tend to isolate themselves from the local society in specially created areas such as technology parks and make no attempt to contribute to desperately needed infrastructure improvements, despite the fact that they are fast becoming the primary users and beneficiaries of such resources. These "walled communities" with little local commitment have caused upheavals in Bangalore, including riots and destruction of property owned by foreign multinationals. As a result, the government has begun to exercise caution in approving foreign-sponsored projects, and a nationalistic contingent is on the rise. Thus, it seems that a mutually beneficial trade arrangement is causing a number of problems on both sides.

Another issue that is not highlighted in Stremlau's article but has been prevalent for decades is the controversy over who does the training versus who gets the skills, that is, should Indians receiving high-level training be allowed to immigrate to places such as the United States in search of employment, or should they be forced to remain at home? This problem, commonly referred to as "brain drain," has long been a problem for many Third World countries and

TABLE 3.1 Foreign Employment as Percentage of Total Employment for 10 Largest U.S.- and Western Europe-Based Corporations

Royal Dutch	72%
Exxon	62%
IBM	48%
General Motors	36%
Nestle	97%
Ford	51%
Alcatel Alsthom	52%
General Electric	25%
Philips Electronic	88%
Mobile	44%

SOURCE: United Nations (1994, p. 6).

NOTE: Presented as cited in: Illon, Lynn. "Tracing Regional Education Trends to a Global Economy." Delivered to the Midwest and Northeastern Regional Meeting of the Comparative and International Education Society. October 28, 1995. Niagara Falls, New York.

has led many to adopt tough emigration restrictions on their elite labor force. Large multinationals frequently exacerbate this problem by luring workers through the payment of salaries (either in the country of origin or in the country of operations) that, although comparatively low by Western standards, are a lot higher than traditional opportunities available in most Third World countries. The issue becomes particularly alarming when one considers the relatively high proportion of foreign laborers employed by such multinationals. Table 3.1 provides evidence for this point.

Such companies are frequently attracted to operate in foreign countries by special provisions such as lower tax rates (in addition to the cheaper supply of labor), meaning that they make little or no contribution to the educational financing of the foreign workers they employ. Furthermore, they are able to generate higher profit margins by using lower-paid workers, frequently to the detriment of workers or job seekers in their countries of origin, meaning that the education investments made in these countries are not being fully capitalized. Once again, both governments and workers receive the short end of the stick while companies profit.

In light of situations such as these, one wonders which will prevail—globalized securitization, global free trade, or nationalistic sentiment? Given that it is more than likely this type of controversy will

continue to escalate, there is a pressing need to find ways to mediate this new form of human commerce in human knowledge and technology capital. Such an effort could begin by making humans a commodity formally regulated by the General Agreement on Trade and Tariffs (GATT). Many would probably oppose this on the grounds that it evokes despicable periods of human history during which humans were traded as commodities—slavery. But palatable or not, we are once again engaging in human trade and, to use the Indian colloquialism, this body shopping is likely to continue unfettered unless some parameters are established. Given international pressures for decentralization and prioritizing education, the regulation of its "products" is unlikely. We feel it would be better to admit the situation and arrive at formally agreed-on terms of exchange than to keep burying our heads in the sand and adopting isolationist immigration and trade policies. In addition, education and social/infrastructure investment requirements should also be entered into the GATT agreements. Such requirements should be considered a normal cost of doing business but, unfortunately, it seems that, without a regulatory mandate, most companies still prefer to exploit the resources of the foreign countries in which they "locate" but do not "live." It is time for corporations to become socially and morally responsible to *more* citizens than those who reside within their original national boundaries. Without such restrictions, we may be doomed to repeat the mistakes of the colonialist era that we now pride ourselves in having overcome.

Conclusion

This chapter has examined the linkages between education, technology, and the economy and the effect these linkages have on the present global socioeconomic order. Our focus has been to paint a broad picture in an attempt to gain a more enlightened understanding of the issues at hand. We have also attempted to raise a series of questions that could serve to guide future thinking on this subject. In summary, we hope to have been able to illustrate the following points: (a) education, technology, and the economy are inexorably and complexly linked; (b) the unprecedented speed in communications is

transforming economic and education systems around the globe; and (c) unless we begin to pay close attention to these transformations and attempt to foresee their social consequences, we may be faced with a barbaric world in which inequality, the dominance of financial "mercenaries," and an uncivilized culture of impunity are the norm. We suggest that the field of education finance should engage in a more comprehensive inquiry.

Notes

1. There are currently four TIGER countries: Hong Kong, Singapore, South Korea, and Taiwan. However, given their high growth rates, Indonesia, Malaysia, and Thailand are also typically thought of as TIGER countries as well, despite the fact that their GNPs are much lower than the four TIGERs.

2. For further information see *The Economist*, 1997; any issue of the *Journal of Education Finance*; any issue of the *Comparative Education Review*; Picus & Wattenbarger, 1996.

3. Currently, there are 10 Big Emerging Markets (BEMs): the Chinese Economic Area (CEA, including China, Hong Kong, and Taiwan), India, South Korea, Mexico, Brazil, Argentina, South Africa, Poland, Turkey, and the Association of Southeast Asian Nations (ASEAN, including Indonesia, Brunei, Malaysia, Singapore, Thailand, the Philippines, and Vietnam).

4. Bill HR 2202, Section 806 (H1-B nonimmigrant) introduced by Chairman Lamar Smith and passed by the House Judiciary Committee on July 20, 1995. (For further information see: http://users.ccnet.com/ez/welcome.html)

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SECTION II

National and State Issues

FOUR

Common "Mythstakes" in Technology Planning

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The incorporation of instructional and telecommunication technologies in schools requires a strategic plan that envisions technology as integral to curriculum development and community involvement. Although technology pervades most aspects of modern life, it is underutilized in schools and needs to become better integrated with the curriculum if students are to be adequately prepared to enter the information age workforce. McKinsey & Company (1995) predict that by the year 2000 as many as 60% of American jobs may require computer literacy and networking skills. These skills include the ability to store, retrieve, and manipulate information on networks (Kaye, 1996). Unfortunately, the majority of technology plans do not establish the links between the need for technology and identifiable instructional priorities (Moersch, 1995).

For curriculum issues, teachers are the key to effective incorporation of technology in instruction. The great promise of technology is that it can improve student achievement, motivation, critical thinking, and cooperation. These accomplishments, however, depend on

academic and social contexts. Research in instructional technology has identified factors that influence outcomes, including subject matter, purpose, specific hardware and software, the ratio of students to media, the amount of time available, the physical location of technology, and the aptitude and learning style of the student (Barron & Orwig, 1995; Schofield, 1995; Thompson, Simonson, & Hargrave, 1992). Teachers, therefore, not only need to improve their own technology literacy levels but also need to learn how to adapt their classroom teaching styles and extend their instructional strategies to include greater use of technologies, especially computers.

Emerging instructional technologies and telecommunications can also be harnessed to strengthen ties between schools and communities. As Lewicki (1994) describes, "Every school site is rooted in the soil of the neighborhood" (p. 84). Although schools use multiple ways to communicate and distribute information to the community, Holte (1995) calls for schools to be more proactive about using technologies to effectively connect schools and communities. Examples of these technologies include (a) e-mail to allow communication between parents and teachers, between community members and the school board, between teachers and their colleagues, and between students and resource people around the world; (b) school hotlines to provide information about lunch menus, homework assignments, closings, and events; (c) conferencing systems to link guest speakers with students in classrooms; and (d) on-line catalog systems, reference works, and computer files to link communities to each other for distant learning (Holte, 1995; McKinsey & Co., 1995).

Technology, however, is not an end in itself. The high costs of technology require a justification for technology planning that is more visionary and comprehensive than just planning hardware purchases. A successful technology plan must be a component of a larger strategy that focuses on improving learning and communication. This strategy to improve student achievement and community involvement necessitates the continuous allocation of resources to equipment and software upgrades; a commitment to ongoing training for teachers, parents, and community members; and a desire to provide local schools with access to global resources.

Unfortunately, because technology is complex and changes rapidly, the technology planning process can be misguided by myths fostered

by a lack of knowledge, vendor hyperbole, faculty resistance, or pressure from the business community. Twelve common myths are addressed below that can be grouped under three main areas: technology planning, professional development, and utilization. Misinformation can result in a poor return on investments in technology. Understanding that these statements *are* myths, however, can help inform technology decision making in schools.

Myths About Technology Planning

The process of technology planning requires an investment of time and resources from numerous stakeholders, takes place at both school and district levels, emphasizes teacher training, builds in flexibility, and budgets yearly for technology purchases (Roblyer, Edwards, & Havriluk, 1997). In the long run, this planning saves time and money, helps achieve goals, builds motivation, and increases the likelihood of benefits from technology's potential to improve teaching and learning (Roblyer et al., 1997).

Some schools achieve their goals because they have technology plans that provide the flexibility needed to respond to changing needs and equipment. Others have technology plans that are never used, that never get finished being written, or that are so restrictive that they defeat their purpose. The following myths contribute to their failure.

1. *Technology plans are useless because technology changes so rapidly.*

Many plans fail because of a lack of strategic planning. Instead, they attempt to be too specific about hardware and fail to consider in any depth how technology can benefit teaching and learning. Brody (1995) describes the difference:

> Most important is the *strategic plan* that can serve as the technology program's underpinning for several years. These plans are broad and conceptual in nature, recommending general directions to be taken. In contrast, *project planning*, while often complex, concentrates on the tactical details associated with actual implementation. Whereas the strategic plan is more concerned

> with ideas, concepts, and general directions which impact many projects, the project plan places increased attention on the specific and detailed tactical actions associated with a single project or program. (p. 7)

To avoid developing ineffective technology plans, refer to Brody (1995), Dede (1989), Hunter (1995), Lumley and Bailey (1993), Maryland State Department of Education (1991), Picciano (1994), and Solomon (1995) for useful strategies, guidelines, and models for developing and funding technology plans.

2. The computer staff should design the technology plan.

Although technology holds great promise for impacting the educational system, its nature is complicated. Increased specialization among professionals forces them to cooperate to plan under complex conditions. It is essential, therefore, that decision makers rely on input from teachers, librarians, administrators, support personnel, curriculum designers, instructional technologists, and community representatives as well as from computer specialists (Beltrametti, 1993; Brody, 1995; Roblyer et al., 1997). The degree of complication necessitates a clear vision based not on myths but on facts provided by all those involved.

3. We have to buy what businesses are using.

Given the rate at which technology changes, purchases made today are not what students will be using on the job in 1 year, 5 years, or 10 years. In the technology plan, the question that should be answered is not, "What platform and software do we purchase?" but rather, "How will technology be used and with what impact?" To date, more educational programs have been developed for use on the Macintosh, whereas more business programs have been developed for Windows. Although most software developers eventually design programs for both platforms, if the priority is for students to learn more effectively subject-specific content via computers, then software should be chosen that accomplishes that goal and equipment purchased that runs that software.

The longevity of a particular type of software also needs to be considered. It is more important that students understand what word processing software can do, what it is used for, and how it can save time and money than it is that they know how to use a specific version of a particular word processing program that will change every 6 months.

Another consideration is the amount and type of technical support that is provided with equipment warranties. More expensive, high-quality equipment that includes competent technical support and fast on-site repairs will save time and money over less expensive equipment that lacks this level of support.

4. Instructional technology means computers.

As schools develop their plans for technology integration, they need to consider how to incorporate the many varied forms of instructional and telecommunication technologies. Cuban (1986) describes instructional technology as "any device available to teachers for use in instructing students in a more efficient and stimulating manner than the sole use of the teacher's voice" (p. 4). Seels and Richey (1994) go beyond this idea of devices to define instructional technology as "the theory and practice of the design, development, utilization, management and evaluation of processes and resources for learning" (p. 1). Technologies that are available for classroom use include traditional media such as audiotapes, bulletin boards, posters, photographs, radio, slides, speaker phones, television, laser discs, and videotapes. Technologies gaining greater acceptance include CD-ROMs; distance education systems; integrated learning systems; Internet web pages; and computer-based tutorials, drills, and simulations. Productivity programs include word processing, spreadsheets, databases, e-mail, and graphics. At the administrative level, computer programs can facilitate scheduling, budgeting, accounting, inventory, and grading (Ely, 1992; Kearsley, 1990).

Schools can also communicate and distribute information to the community using different types of telecommunication technologies such as what the Maryland State Department of Education (1991) recommends: (a) for voice: two-way communication and messaging systems such as telephones, public address systems, and voice mail;

(b) for video and audio: production and transmission capabilities from the school and external providers to the school and community; and (c) for data: interconnection throughout the school with a LAN (local area network) plus two-way access through WANs (wide area networks) to resources such as bulletin boards, databases, other schools, and homes. Rhodes (1995), however, cautions that to make good use of these kinds of technologies the focus must be on the *information* that technology enables students, teachers, and administrators to access and on the *connections* that will support that information's flow.

5. *If we invest a lot of money in a computer lab or distance learning classroom, it will be obsolete in a year.*

What does obsolescence mean? Just because a new model arrives on the market weeks after an equipment order is placed does not mean that a purchase cannot meet learning needs and accomplish desired objectives for years to come.

Educational needs should dictate the extent to which technology is replaced. In their effort to prove they are state-of-the-art, many schools don't consider how they can repurpose older equipment, especially computers. Even if they can't access e-mail or the Internet, older computers could still be used for word processing, tutorials, or keyboard practice. For example, in a computer lab at a state university Macintosh SEs and dot matrix printers were kept in use after several PowerMac 7200s and a laser printer were installed. During a journalism class, the entire lab was used by students for word processing and printing. By integrating the use of both old and new computers, the professor was able to accommodate all the students in the class.

6. *Once we complete our technology plan/build our computer lab/install the distance learning classroom, we can reallocate those funds.*

A good strategic plan will consider that technology use may increase over time as users become more comfortable with and knowledgeable about technology. It will also recognize that the ongoing use of technology necessitates upgrading hardware, software, and skills; planning for repairs and maintenance; and investing in telecommu-

nications access. This is a recognition of and commitment to the requirements of the information age. To ensure funding for long-term maintenance and growth, the strategic plan must integrate community and business needs with curriculum goals.

How can the community be persuaded to make a long-term commitment to technology in schools? One way is to no longer consider it to be restricted school property. Instead, it could be considered to be community property and made available to the community outside of regular school hours. Many schools offer low-cost computer training to community members. Some open their labs at night for students to complete schoolwork, for parents to read and send e-mail from and to teachers, and for community members to access the Internet for information or to improve their computer skills. This level of public access not only provides a valuable service but also increases the school's visibility in a positive way.

Myths About Professional Development

Teachers are the key to effective and efficient technology utilization. When technology is available, however, it is frequently used with styles of teaching that fail to maximize its full potential (National Governors' Association, 1996). This could be the result of inability, improper training, technophobia, or a lack of practice using alternative teaching strategies. Therefore, adequate professional development is needed if technology is to help schools improve learning.

7. Teachers don't take advantage of training opportunities.

Due to a lack of exposure or to prior bad experiences, some teachers are technophobic, afraid to try to use technology, especially computers, with their students. Because fear and inertia contribute to a resistance to change, the people involved must want to learn (Schofield, 1995). To help overcome resistance, professional development efforts can start by concentrating on those areas that make someone's job easier, more efficient, or more effective and should address the needs and concerns of end users. For example, a workshop for teachers on spreadsheets could begin by creating a gradebook

template and emphasizing how this can save time. Then, the workshop could demonstrate different ways that students can use spreadsheets across content areas.

Administrators also need to carefully coordinate the timing of professional development activities. Too frequently, there is a long time lag between training and the opportunity to use what was learned. Equipment may be installed weeks after training is conducted or vice versa. Even those who initially are motivated eventually become discouraged by the delay.

Furthermore, training needs vary among teachers according to their skill and comfort levels. Realistic amounts of training need to be provided to achieve the desired results. According to the U.S. Congress Office of Technology Assessment (cited in McKinsey & Co., 1995), 30 hours of training are needed to successfully use technology at a basic level. For a teacher to have good operational knowledge of hardware and perform basic troubleshooting requires 45+ hours of training and 3 months of experience. For a teacher to actively develop entirely new learning techniques that utilize technology requires 80+ hours of training and 4 to 5 years of experience.

8. Teachers are not using the technology that is available.

Sometimes, instructional technology is purchased in response to a particular interest or need. A small group of teachers may be using the technology frequently, but administrators are not aware of the extent to which it is being used or think it should receive widespread use. The other teachers, however, may perceive that its use is restricted. This is exacerbated by housing the equipment in a limited-access area such as a science lab. Small-scale innovation attempts like these frequently fail because they lack a critical mass of people, funding, or equipment and the traditional system of rewards does not encourage adoption (Dede, 1989). Few people initially adopt any innovation. The rate at which others adopt innovations depends on multiple factors, including their perception of its relative advantage and complexity, their level of involvement in making decisions, and the nature of their social system (Rogers, 1983). Professional development efforts should consider these factors.

Many other barriers inhibit the adoption of technology in classrooms. For teachers, the disadvantages include difficulty finding appropriate media or software, a lack of time for review and preparation, unfamiliarity with hardware or software, inaccessibility of equipment, poor technical support, and the inability to quickly solve problems (Cuban, 1986; Evans-Andris, 1996; Schofield, 1995). Additionally, equipment failures in front of students are embarrassing and a threat to teachers' sense of competence and authority (Schofield, 1995).

Schools can overcome these barriers by providing professional development opportunities, by creating incentives to learn and use technology, and by recognizing that comfort and expertise come only with experience. More important, effective leadership is needed to help turn laggards into technology adopters. Principals who demonstrate enthusiasm and concern for change communicate their expectations, advise and support teachers, and monitor their progress provide a source of motivation for teachers (Evans-Andris, 1996; Moersch, 1995).

> 9. *Teachers will change from "knowledge experts" to "knowledge facilitators" working with students who follow individual and team learning plans.*

In this myth, students are self-directed in their search for knowledge—which assumes an unqualified love of knowledge and a great deal of self-motivation. Loveless (1996) points out that students rarely exhibit a love of learning and must be motivated and guided by their teachers.

This myth also presumes that administrators, teachers, and students can readily accept different classroom and school cultures. Typically, teachers manage about 30 students in the classroom. They can accomplish this because they are viewed by students as both information experts and authority figures. Changing their role to knowledge facilitators does not diminish those roles. Instead, it adds the dimension of managing the labor of students who may be working at different speeds on different tasks. The culture of these classrooms can also be more active, energetic, and noisy and may require greater

flexibility in scheduling and assessment methods. Professional development efforts must address these concerns.

Myths About Technology Utilization

The desired outcome of technology planning is to impact learning in positive ways by investing in appropriate technology and effective professional development. One determination of whether technology is used successfully or not depends on how equitably it provides access to information to all students. Access to technology, however, is not where it goes but how it is used (National Governors' Association, 1996). The ultimate determinant of success is not reaching some ratio of equipment to students but ensuring that knowledgeable teachers are using technology efficiently and effectively to meet lesson goals and objectives.

10. Even though we don't have a technology plan, we need to get at least one or two computers in every classroom.

Getting computers into schools and employing them in instruction are not the same thing (Loveless, 1996). A computer in every classroom allows schools to show off on parents' night, but without adequate professional development, Internet connectivity, or technical support staff these computers are underutilized. Although some teachers may use them for word processing or record keeping, for instructional benefits to be realized clearly defined objectives must be established for how computers will be used and integrated with the curriculum.

Teachers in general are not very knowledgeable about how to integrate any type of technology into their lessons, much less computers or software. When Schofield (1995) studied utilization in classrooms where computers were available for student use, she found that teachers are not easily able to solve the organizational and scheduling problems posed by a low ratio of computers to students. For example, when some students are allowed to use the computers in an adjacent classroom, they aren't able to ask the teacher questions or get assistance solving technical problems. Also, printers are noisy and distracting to those students who are trying to accomplish other tasks.

Another problem is that it is ineffective to attempt to teach a class with one computer without a data display for large screen projection. Small monitors are useless for group instruction, yet few schools invest in projection technology so the entire class can see what the teacher is demonstrating. It is possible for groups of students to work on different tasks simultaneously and rotate computer usage among groups. But as Loveless (1996) puts it, "Coming up with imaginative, educationally inclusive ways for groups of students to use a classroom's few computers remains a difficult task" (p. 30).

11. Teachers will be replaced by computers.

This myth ignores the culture of the classroom and doesn't consider how teachers meet important social and emotional needs for their students. Its persistence as a myth seems to stem from efforts in artificial intelligence that are applied to instruction. Although highly advanced computer-based tutorials that utilize artificial intelligence technology are being designed that adapt to students' individualized learning styles and needs, they are expensive and labor intensive to design. It will be many years before this technology is common in classrooms and available for all grade levels and curriculum areas. It is also doubtful they will be able to respond the way teachers do to changes in students' readiness for learning and the social context of the classroom. As Schofield (1995) cautions,

> Computers . . . are social as well as technological objects, and their use is subject to the vagaries of the social milieu in which they are available for use, although over time they may profoundly influence that milieu. If they are too out of step with existing practice, they are likely not to be used extensively, or they will be used in ways that do not take full advantage of their potential. (p. 228)

Understandably, teachers are concerned about the role of technology in their classrooms. But it is unlikely that these computer-based systems will replace them. Teachers best understand their students, the classroom setting, and the complexity of the school environment and design instructional tasks accordingly.

12. Technology will transform education.

Teachers, students, and communities can transform education—technology merely provides some of the tools and processes that can support educational reform and create pressure for change. Years of media research have shown that technology and media in the classroom do not benefit all students equally nor result in across-the-board increases in achievement. Technology in schools, however, can help teachers become more efficient and effective and can help improve student motivation and engagement with the learning process. Additional research in the interactions between technology and learner abilities will inform teachers of the best ways to use technology to benefit students.

Conclusion

Purchasing technology is not an end in itself. To plan for integrating technology into a school's curriculum requires a strategic vision for that curriculum. That vision becomes the foundation for a plan that demonstrates how technology supports instruction and comprehensively addresses the issues of incorporating many different kinds of instructional technology in classroom instruction; of providing suitable professional development that meets the needs of different teachers; of purchasing high-quality software and media for all disciplines; and of providing links between schools, parents, and communities for the long-term benefit of all.

For technology to be worth its cost, the technology plan also has to show how it helps to meet the needs of the community by preparing students for work in the information age. If it continues to be considered as something separate, Brody (1995) cautions that "students will have greater difficulty in accepting and understanding one of the principal tenets of modern technology, the fact that technology is part of virtually all aspects of modern society" (p. 45).

Dealing with technology is not easy. But no one can ignore it any longer or deny that it is a task that needs to be done. Strong leadership is required to deal with competing demands for scarce budgets, to

motivate teachers to incorporate technology into their teaching strategies, and to make creative use of emerging technologies.

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